

**Insights to Support Transportation Equity in Rural America:
A Primer and Practical Compilation of Concepts, Resources, Tools, and
Reforms
*Final Report***

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16. Abstract The primary purpose of this project was to review, analyze, and compile information and resources to support transportation equity in rural communities throughout the U.S. We used publicly available databases and information in the form of published reports, articles, and presentations to examine the following research questions: <ul style="list-style-type: none"> • What resources are available to support transportation equity in rural communities? • What measures are available to guide the assessment of transportation equity and the prioritization of transportation investments? • What transportation policy and program innovations and reforms are available to support transportation equity in rural communities? We provide a review of key concepts (including rural, equity, mobility, and accessibility), key resources (from the Legislative and Executive Branches as well as the Transportation Research Board and additional entities), measures (including tools to identify people and places for equity considerations as well as tools for measuring the impact of projects), and reforms (including reforms to support expanded access to travel such as universal basic mobility, and reforms to improve travel conditions such as sidewalk network improvements). With this primer report, we hope rural transportation practitioners feel more informed about transportation equity concepts, resources, tools, and reforms, and empowered to support transportation equity policies and programs for fairness and justice in their communities.			
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About the Western Transportation Institute

The Western Transportation Institute (WTI) was founded in 1994 by the Montana and California Departments of Transportation, in cooperation with Montana State University. WTI concentrates on rural transportation research; as stewards and champions of rural America, WTI also has a strong interest in sustainability. WTI research groups create solutions that work for clients, sponsors, and rural transportation research partners. WTI Research Centers include the Montana Local Technical Assistance Program, the National Center for Rural Road Safety, the Small Urban, Rural and Tribal Center on Mobility, the Federal-Public Lands Transportation Institute, and the West Region Transportation Workforce Center.

About the Small Urban, Rural and Tribal Center on Mobility

The mission of the Small Urban, Rural and Tribal Center on Mobility (SURTCOM) is to conduct research and provide leadership, education, workforce development and technology transfer in all transportation-related aspects of mobility for people and goods, focusing specifically on small urban, rural and tribal areas. Member institutions include the Western Transportation Institute at Montana State University, the Upper Great Plains Transportation Institute at North Dakota State University, and the Urban and Regional Planning program at Eastern Washington University.

Disclaimers

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Data Statement

This report entailed review, compilation, and analysis of publicly available information in the form of published reports, articles, and presentations.

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1 Introduction

The primary purpose of this project was to review, analyze, and compile information and resources to support transportation equity in rural communities throughout the United States. We used publicly available databases and information in the form of published reports, articles, and presentations to examine the following research questions:

- What resources are available to support transportation equity in rural communities?
- What measures are available to guide the assessment of transportation equity and the prioritization of transportation investments?
- What transportation policy and program innovations and reforms are available to support transportation equity in rural communities?

This project was motivated by longstanding and growing commitments and efforts to devote attention and resources to transportation equity research, policy, planning, and practice (see, e.g., GSA 2023, TRB 2021, 2022, BTS 2023, USDOT 2022a, 2022b, CUTR 2021, Karner, Levine, Dunbar, and Pendyala 2023, Karner, Bills, and Golub 2023, Twadell and Zgoda 2020) together with the need and opportunity to identify transportation equity resources, measures, and reforms that may be helpful to rural transportation practitioners. This project occurs within the context of the Biden-Harris Administration’s prioritization of equity and environmental justice (E.O. 13985 of Jan. 20, 2021, E.O. 14008 of Jan. 27, 2021, E.O. 14091 of Feb. 16, 2023, E.O. 14096 of Apr. 21, 2023, CEQ 2022, White House 2023) and benefits from an established and growing body of research and guidance on the measurement and assessment of equity and related concepts, such as accessibility (see, e.g., Karner, Levine, Dunbar, and Pendyala 2023, Sundquist, McCahill, and Brenneis 2021, Twadell and Zgoda 2020), as well as planning and prioritization for equity in transportation and related fields, such as public health and community and economic development. With this project, we hope to provide a useful primer on key concepts as well as a compilation of practical resources. This guidance may be especially relevant to rural transportation practitioners and decision makers interested in learning more ways to support equity in their communities.

2 Key Concepts

This section provides a brief overview of key concepts relating to transportation equity in rural communities. It is intended to create a working foundation and practical vocabulary to support understanding of the resources, measures, policies, and programs discussed in the subsequent sections of the report. As discussed further in **Section 2.2** and **2.3**, the concepts of equity, environmental justice, and accessibility are distinct but closely related. The language and practice surrounding these concepts continues to evolve, and in some ways, equity is increasingly being used as a broadly encompassing term, inclusive of the concepts and considerations surrounding nondiscrimination, environmental justice, and accessibility.

2.1 Rural

The National Cooperative Highway Research Program (NCHRP) Research Report 988 on Rural Transportation Issues: Research Roadmap provides a helpful overview of the complexity of defining rurality, and acknowledges that, “since numerous government agencies administer separate urban and rural programs with differing eligibility criteria, rural is defined in multiple ways, sometimes indefinite and often conflicting” (Sullivan, Clouser, and Shaw 2022, p. 1). That report chose to not adopt a single definition of “rural” but offered a helpful rural community typology based on a variety of characteristics (see Figure 1 and pp. 1-2 in Sullivan, Clouser, and Shaw 2022).

Additional discussions on defining rurality are offered by the U.S. Department of Agriculture (USDA) Economic Research Service (ERS; Cromartie and Bucholtz 2008) and the Rural Health Information Hub (RHIH 2022). In practice, the most commonly used definitions of rural come from the U.S. Census Bureau, the Office of Management and Budget, and the USDA ERS (RHIH 2022), though “the key is to use a rural-urban definition that best fits the needs of a specific activity” (Cromartie and Bucholtz 2008).¹

Regardless of the specific urban-rural definition employed, rural communities in America face significant transportation challenges. The U.S. Department of Transportation (USDOT) Bureau of Transportation Statistics (BTS) compiled a helpful overview of rural transportation statistics that highlights the high number of total lane-miles, higher roadway fatality rate, growing freight volume, and longer detours in rural areas (BTS 2022). The NCHRP Research Report 988 also provides an overview of transportation issues and obstacles unique to rural areas, including funding challenges to providing adequate transportation services, infrastructure, and maintenance, limited transportation options, and related sociodemographic population and poverty trends (Sullivan, Clouser, and Shaw 2022, pp. 8-10). Demographic turbulence in the 21st century due to the Great Recession and its aftermath, as well as the COVID-19 pandemic (Johnson, 2022, 2023), has important implications for “contemporary policy making intended to increase the viability of rural communities and enhance their contribution to the nation’s

¹ The USDOT BTS Rural Funding Eligibility Tool (<https://www.transportation.gov/rural/eligibility>) is a practical tool to consult when pursuing a federal transportation funding opportunity, and rural program eligibility questions may be submitted to rural@dot.gov or program offices as well. The DOT Navigator is also a helpful resource to consult (<https://www.transportation.gov/dot-navigator>). State DOTs may also provide helpful information about eligibility for state and federal rural transportation funds.

material, environmental, and social well-being” (Johnson 2022). This report is intended to offer practical guidance to support these policies throughout the U.S.

2.2 Equity and Environmental Justice

Equity, as a concept and term, has a long history in American society, with multiple uses and meanings, depending on the context. However, equity’s etymology suggests a clear association with notions of fairness and justice and it is closely associated with national commitments to nondiscrimination and environmental justice (see further discussion of the legal and policy context in Twadell and Zgoda 2020, and Karner, Levine, Dunbar, and Pendyala 2023, as well as below in **Section 3.1** and **3.2**; for further discussion of the historical context see, e.g., Sanchez and Brenman 2007, Martens 2017, and Martens and Golub 2021).

While definitions of transportation equity may vary, “a commonality among them is the concept that it involves proportional distribution of the benefits of transportation investments and systems, and the avoidance of negative externalities or negative impacts (for example, the loss of transit service) to historically disadvantaged populations (Johnson, Rhoads, Slocum et al 2022, p. 5). Put succinctly, “equity is a representation of fairness in the distribution of benefits and burdens” and “an important expectation of the public in transportation planning and project selection” (Williams, Kramer, Keita, and Boyd 2020). Karner, Levine, Dunbar, and Pendyala (2023, p. 13) note that, “clearly, transportation equity is multifaceted, but it generally calls attention to the impacts of transportation planning activities on underserved populations.” They go on to summarize that:

Transportation agency goals related to transportation equity are undergirded by a strong legal, regulatory, and policy foundation stemming from Title VI of the 1964 Civil Rights Act, as amended, the 1987 Civil Rights Restoration Act, Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), and the Americans with Disabilities Act, among others that prohibit discrimination based on race, color, national origin, ability, age, and gender. (Karner, Levine, Dunbar, and Pendyala 2023, p. 12)

The Transit Cooperative Research Program (TCRP) Research Report 214 on Equity Analysis in Regional Transportation Planning Processes, Volume 1: Guide provides a helpful overview of the meaning of equity as it relates to transportation planning, as well as national commitments to nondiscrimination and environmental justice (Twaddell and Zgoda 2020, pp. 2-3). The report cites the Federal Highway Administration (FHWA) Environmental Justice program’s definition:

Equity in transportation seeks fairness in mobility and accessibility to meet the needs of all community members. A central goal of transportation equity is to facilitate social and economic opportunities by providing equitable levels of access to affordable and reliable transportation options based on the needs of the populations being served, particularly populations that are traditionally underserved. This population group includes low-income individuals, minority individuals, elderly persons, children, people with [limited English proficiency], and/or persons with disabilities. (Twaddell and Zgoda 2020, p. 2)

This discussion of equity as it relates to fairness in accessing opportunities and participating in society requires the delineation of two additional foundational concepts: mobility and accessibility, discussed next in **Section 2.3**.

Additional entities have offered definitions of transportation equity. The State Smart Transportation Initiative, a program of Smart Growth America, states that:

Equity in transportation is about making sure that everyone has access to employment and other opportunities; that travelers do not impose safety, noise and environmental burdens on vulnerable residents; that bike and pedestrian networks serve all, including those with disabilities; and that when enforcement is needed to ensure safety it is administered without bias. (SSTI 2023)

Along with equity and environmental justice, the terms “mobility justice” and “transportation justice” have come into increasing use (see pp. 5-7 in Johnson, Rhoads, Slocum et al 2022 for further discussion). For example, the National Association of City Transportation Officials defined “transportation justice” to mean that “all communities have access to a safe, reliable, affordable, and equitable transportation system that connects them to the places, people, and resources they need to thrive” (NACTO 2022). The Shared Use Mobility Center is another organization using the term “mobility justice” and focusing attention on transportation equity. Earlier this year, the Transportation Research Part D: Transport and Environment journal published a special issue on transportation justice, “motivated by ongoing – and seemingly intractable and unjust – disparities in transportation system benefits and burdens around the world” (Karner, Bills, and Golub 2023).

Notably, equity and equality are distinct concepts. TCRP Research Report 214 cites an Oregon Metro document from 2016 when it notes this distinction in relation to government efforts:

[A color-blind approach]...is founded on the well-intended idea of equality, which means that everyone receives the same treatment. Unfortunately, equality assumes sameness – that everyone faces the same barriers. Equality does not take into account historical or current forms of discrimination that are present in our public institutions and structures, such as redlining, which prevented many people of color from owning property and accruing wealth, or predatory lending practices targeting communities of color. (Twaddell and Zgoda 2020, p. 3)

Likewise, Karner, Bills, and Golub (2023, p. 2) note that, “the fact that a disparity exists is not evidence of injustice” and “it is possible – and likely unavoidable – for disparities and justice to coexist.” This is because “integrated transportation and land-use systems confer different levels of access and impacts across space and people enjoy some degree of choice over travel and residential/workplace locations” (Karner, Bills, and Golub 2023, p. 2). This distinction between disparity and injustice does not lessen or negate our national commitment to nondiscrimination, as codified in laws such as the Civil Rights Act of 1964 and the Americans With Disabilities Act of 1990. Rather, these federal civil rights laws prohibit unlawful discrimination on the basis of race, color, national origin, or disability status (see **Section 3.1** and **3.2** for additional discussion of these laws and guidance for compliance with respect to transportation programs and services).

2.3 Mobility and Accessibility

Mobility and accessibility are distinct terms, and their use has important implications for equity. Mobility is typically understood as the act of overcoming distance or moving through space, while accessibility refers to the act of reaching opportunities. Accessibility depends, in part, on mobility, but is also influenced by other factors, such as the availability of transportation options, features of the built environment, and land use patterns.² Transportation planning that is primarily focused on mobility prioritizes measures associated with overcoming distance, such as vehicle throughput, congestion delays, and other speed-based outcomes. In contrast, transportation planning that is centered around accessibility operationalizes measures associated with participation in society, such as trip levels and activity patterns, employment and educational outcomes, and the experience of robust and resilient transportation choice sets. As a result, transportation planning for accessibility tends to result in a broader set of transportation investments and performance measures, which in turn tend to support the dignity and life chances of all members of society – even those who cannot afford high-cost personal mobility options, such as private vehicles. In developing his formal theory of transport justice, Karel Martens argued that the historically dominant social concept of transportation as mobility has led to transportation investments that cause “real hardships” for those without private vehicles (Martens 2017, pp. 31-32). However, Martens argues that the social meaning of transportation has become increasingly contested, and that accessibility better captures the social meaning of transportation as a unique enabler of choice, possibilities for experience, and freedom (Martens 2017, p. 51-54, see also Martens, Golub, and Robinson 2012 and Martens 2012). According to Martens, the experience of insufficient accessibility – when “accessibility levels are so low that they directly limit the possibility of a person to participate in a normal range of activities” – is unjust (Martens 2017, pp. 126, 133-134). As Martens states, “transportation planning based on principles of justice *is* transportation planning for a fair distribution of accessibility” (Martens 2017, p. 20, emphasis in original). Karner, Bills, and Golub (2023, p. 1) note that:

Transportation planning and infrastructure decisions often ignore the needs of transportation-disadvantaged populations. This creates inequitable outcomes and results in situations where many cannot meet basic needs for mobility and access...Our transportation systems, travel behaviors, and policies are therefore critical sites for advancing and implementing equity and justice ideals—creating a world where people have true access to the transportation resources they need to lead meaningful, joyful, fulfilling, and dignified lives.

Similarly, Karner, Levine, Dunbar, and Pendyala note that “put simply, accessibility – connections between people and opportunities – is the most important economic and social benefit created by a transportation system and it facilitates participation in activities that individuals need to lead a meaningful life” (2023, p. 10).

² Similar to equity, accessibility has related but distinct meanings and uses. Accessibility may refer to how freely or feasibly available the use or benefits of a resource, service, or program are for persons with disabilities, and it may also refer more broadly to the general notion of accessing opportunities. As the social meaning of transportation shifts away from mobility and toward accessibility, terms such as “accessibility planning” may at times be too generalized to convey the purpose or focus of the activity.

3 Key Resources

This section provides a summary of key resources available to rural transportation practitioners interested in learning more about transportation equity, with an emphasis on recent and significant policymaking, convenings, and other contributions. The resources covered in this section are intended to serve as a helpful starting point but are not exhaustive.

3.1 Legislative Branch

Transportation agencies are legally required to comply with federal civil rights laws.³ The following laws (among others) have significant and direct impacts on transportation equity:

- Title VI on Federally Assisted Programs of the Civil Rights Act of 1964 (42 U.S.C. §§2000d-2000d-7) states that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.
- Title II on Public Services (Part A) of the Americans with Disabilities Act of 1990 (42 U.S.C. §§12131-12134) states that no qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of services, programs, or activities of a public entity, or be subjected to discrimination by any such entity.
- Title II on Public Services (Part B) of the Americans with Disabilities Act of 1990 (42 U.S.C. §§12141-12165) describes as discriminatory public transportation, intercity rail, or commuter rail vehicles and facilities that are not readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs, and failure to provide complementary paratransit to fixed route service.
- Title III of the Americans with Disabilities Act of 1990 (42 U.S.C. §§12181-12189) prohibits discrimination by public accommodations and in specific public transportation services provided by private entities and describes practices considered discriminatory by private entities that operate fixed route systems, demand responsive systems, intercity bus, and intercity rail.

Since the passage of these landmark civil rights laws, the U.S. Department of Justice (USDOJ) and USDOT (both part of the Executive Branch) have issued guidance on, and acted as stewards of, their implementation (among other Departments as well). In addition, the Civil Rights Division of USDOJ, as well as various offices and programs at USDOT, maintain helpful repositories of information relating to Title VI and the ADA.⁴

³ For additional information about laws, regulations, and guidance related to transportation equity, see helpful overviews by Karner, Levine, Dunbar, and Pendyala (2023, pp. 12-20) and Twaddell and Zgoda (2020, pp. 1-6).

⁴ The Civil Rights Division of USDOJ maintains the following websites: <https://www.ada.gov/> and <https://www.justice.gov/crt/fcs/TitleVI>. USDOT provides transportation-specific resources, including: <https://www.transportation.gov/accessibility>, <https://www.transportation.gov/civil-rights>, <https://www.transit.dot.gov/ADA>, <https://www.fhwa.dot.gov/civilrights/programs/ada/>, <https://www.transit.dot.gov/regulations-and-guidance/civil-rights-ada/title-vi-guidance>, and https://www.fhwa.dot.gov/civilrights/programs/title_vi/.

3.2 Executive Branch

Executive Orders⁵ issued by the Biden-Harris Administration to address equity and environmental justice include (but are not limited to):

- E.O. 13985 of Jan. 20, 2021, on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government.
- E.O. 14008 of Jan. 27, 2021, on Tackling the Climate Crisis at Home and Abroad.
- E.O. 14091 of Feb. 16, 2023 on Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government.
- E.O. 14096 of Apr. 21, 2023, on Revitalizing Our Nation’s Commitment to Environmental Justice.⁶

Impacts of these Executive Orders include (but are not limited to) establishment of Equity Action Plans and an annual update process, release of Equity Action Plans by 90 federal agencies and departments in 2022, creation of the White House Steering Committee on Equity as well as Agency Equity Teams, and creation of the Justice40 Initiative with the goal that 40% of the overall benefits of certain Federal investments (including those for clean transit) flow to disadvantaged communities (GSA 2023, White House 2023).

Equity is one of six strategic goals included in the USDOT FY 2022-2026 Strategic Plan released on April 7, 2022 (USDOT 2022a), and USDOT released its first Equity Action Plan on April 14, 2022 (USDOT 2022b). **Table 1** provides the language used to describe the strategic goal, objectives, and actions included in these documents. USDOT is supporting equity throughout its Modal Administrations (see, e.g., Karner, Levine, Dunbar, and Pendyala 2023), via new and continuing funding opportunities (e.g., Thriving Communities Program, Safe Streets and Roads for All, Reconnecting Communities Pilot Program),⁷ and through the research, technical assistance, workforce development, and education performed at USDOT-designated University Transportation Centers (UTCs) across the country (see **Table 3** in **Appendix 1** for a list of UTCs with a focus on equity, environmental justice, and/or accessibility).⁸ In addition, the Rural Opportunities to Use Transportation for Economic Success (ROUTES) Initiative serves as a hub for rural transportation information, resources, and technical assistance, and supports USDOT’s equity work as well.⁹

⁵ Executive Orders are issued by Presidents to manage the operations of the Federal Government and are distinct from laws passed by Congress, such as those discussed in **Section 3.1**.

⁶ E.O. 14096 of Apr. 21, 2023, “supplements the foundational efforts of Executive Order 12898 [of Feb. 11, 1994] to address environmental justice” and builds upon E.O. 13985 and E.O. 14091, among others.

⁷ For a helpful summary of USDOT funding opportunities and awards related to equity see: <https://www.transportation.gov/priorities/equity/equity-updates>.

⁸ More information about USDOT UTCs may be found at:

<https://www.transportation.gov/content/university-transportation-centers>. As noted in the front matter, funding for this project came from the Small Urban, Rural and Tribal Center on Mobility, a Tier 1 UTC.

⁹ More information about USDOT’s ROUTES Initiative may be found online: <https://www.transportation.gov/rural>.

Table 1. Description of the USDOT Strategic Goal, Objectives, and Actions for Equity

<p>Strategic Goal: Reduce inequities across our transportation systems and the communities they affect. Support and engage people and communities to promote safe, affordable, accessible, and multimodal access to opportunities and services while reducing transportation-related disparities, adverse community impacts, and health effects.</p>	<p>Strategic Objectives:</p> <ul style="list-style-type: none"> • Expanding Access • Wealth Creation • Power of Community • Proactive Intervention, Planning, and Capacity Building
<p>Action: Expanding Access By developing a national transportation cost burden measure, USDOT will have a critical tool to address barriers to accessing affordable transportation options that have consequences on economic mobility—and help bring measurable transportation benefits to disadvantaged communities per Justice40.</p>	<p>Action: Wealth Creation By providing technical assistance to small, disadvantaged businesses, USDOT will help increase their understanding of how to navigate the USDOT contracting process, gain awareness of upcoming contract opportunities, and enhance their core competencies and skills—enabling them to more effectively compete for USDOT contracting opportunities and build wealth.</p>
<p>Action: Power of Community Reinvigorating USDOT’s programmatic enforcement of Title VI of the Civil Rights Act, including re-emphasizing agency review of the potential discriminatory impact of grantees’ proposed activities before awarding federal funds—as opposed to waiting until a project is delivered to enforce civil rights protections—will prevent disparate impacts on protected classes and empower communities in transportation decision-making.</p>	<p>Action: Interventions By launching a national technical assistance center, USDOT will provide direct, hands-on technical support with local impact—providing targeted assistance in areas of planning, project development, grant applications, and project delivery to ensure that transportation investments and benefits support underserved and overburdened communities.</p>

Sources: USDOT FY 2022-2026 Strategic Plan (USDOT 2022a) and Equity Action Plan (USDOT 2022b). For more information about USDOT’s equity efforts, see: <https://www.transportation.gov/priorities/equity>.

As mentioned above in **Section 3.1**, USDOT acts as one of the stewards for the implementation of Title VI of the Civil Rights Act of 1964 and the ADA to ensure nondiscrimination. USDOT also works to implement the administrative directives for Federal agencies issued in Executive Orders and has developed policy guidance in the form of circulars to clarify the meaning of these laws and directives, including the overlap in, and distinctions between, for example, Title VI requirements and environmental justice considerations (see, e.g., FTA 2012a, 2012b, 2015). As noted in the TCRP Research Report 214, “the requirements of the Title VI statute and E.O. 12898 are distinct, but, there is overlap between the two, and transportation agencies often conduct regional equity analyses that address Title VI, [environmental justice], and other non discrimination regulations” (Twaddell and Zgoda 2020, p. 4, see also Karner, Levine, Dunbar, and Pendyala 2023, pp. 12-20).

3.3 Transportation Research Board

The Transportation Research Board (“TRB”) is part of the National Academies of Sciences, Engineering, and Medicine (“NASEM”), and its mission is to “provide leadership in

transportation improvements and innovation through trusted, timely, impartial, and evidence-based information exchange, research, and advice regarding all modes of transportation.” NASEM and all of its divisions are independent advisers to the President of the United States, the Congress, and federal agencies on matters of national importance.¹⁰

The scopes of three TRB standing committees are specifically dedicated to the concepts of equity, environmental justice, and/or accessibility, as summarized in **Table 4** in **Appendix 2**. The committees are: 1) Standing Committee on Equity in Transportation (AME10); 2) Standing Committee on Accessible Transportation and Mobility; and 3) Standing Committee on Contracting Equity (AJE60).¹¹ AME10 is a relatively new committee that was created as a result of TRB’s recent committee restructuring process; it replaced the Standing Committee on Environmental Justice (ADD50), which itself had created a joint subcommittee on transportation equity with several cosponsoring committees to develop and execute the Conference on Advancing Transportation Equity, held in 2021.¹² This committee history speaks to the close alignment between the equity and environmental justice concepts discussed above in **Section 2.2**.

In addition, TRB’s Cooperative Research Programs have completed, active, and pending research projects focused on equity, environmental justice, and/or the ADA, as summarized in **Table 5** in **Appendix 2**; many of these projects have relevance to rural transportation practitioners.¹³ A workshop on rural equity was also held at the 99th TRB Annual Meeting in January 2020, as part of the research effort that produced NCHRP Research Report 988 on Rural Transportation Issues: Research Roadmap (see Figure 18 and pp. 52-53 in Sullivan, Clouser, and Shaw 2022). The workshop included a panel presentation, as well as roundtable discussions, and provided an opportunity for USDOT staff to collect information for the ROUTES Initiative (Sullivan, Clouser, and Shaw 2022, p. 53). In addition, NCHRP Research Results Digest 230 is dedicated to State DOT Best Practices for Title VI Compliance (NCHRP 2009) and TCRP Research Report 214 provides a helpful overview of requirements relevant to equity analyses, including Title VI compliance:

Title VI requires agencies to ensure there is not discrimination based on race, color, or national origin, which involves (1) analyzing whether design, construction, or future changes in service delivery for transportation projects have a disparate impact on those populations, and (2) if disparate impacts are found, either demonstrating that these impacts are unavoidable or identifying ways to mitigate them. (Twaddell and Zgoda 2020, p. 4)

¹⁰ For more information, see the following NASEM webpages:

<https://www.nationalacademies.org/trb/transportation-research-board> and <https://www.nationalacademies.org/about>.

¹¹ For more information, see the AME10 website: <https://ame010.wixsite.com/ame010>.

¹² A Conference Summary and Action Brief was produced as a Transportation Circular for the Conference on Advancing Transportation Equity (TRB 2022) and conference session recordings were archived online (TRB 2021). TRB also held a webinar on “Advancing Transportation Equity – Key Insights from 2021 and Looking to 2024” in March 2023 (TRB 2023a).

¹³ In celebration of the 30th anniversary of the passage of the ADA, TCRP compiled a curated list of ADA resources, including Synthesis and Research Reports (TCRP 2023, see: <https://www.trb.org/TCRP/ADAResources.aspx>).

The TRB Consensus and Advisory Studies Division has also convened a Consensus Study Committee to “identify and advise on opportunities for using data, metrics, and analytic methods to better inform decisions for allocating and programming federal surface transportation funds to enhance equity for underserved communities.”¹⁴

TRB often holds webinars to disseminate the findings of its sponsored research or to convene experts to share information about specific topics related to its mission and efforts. On August 29, 2023, TRB is holding a webinar on “Successful Environmental Justice Planning” to examine the history of environmental justice within transportation projects and share successful strategies for addressing environmental justice and equity, with an emphasis on planning and processes related to implementation of the National Environmental Policy Act (TRB 2023b).

TRB also produced a four-part blog series on equity to feature TRB research:

- Building Socioeconomic Equity Through Transportation Research (TRB 2023c).
- Making Travel More Equitable for People with Disabilities (TRB 2023d).
- Steps for Transportation Workforce Diversity Outlined in TRB’s Research (TRB 2023e).
- Equitably Connecting Rural and Urban Populations (TRB 2023f).

The fourth in the series (TRB 2023f) is especially relevant for rural transportation practitioners, and features resources on rural public transportation planning, cost estimates, innovations (e.g., microtransit), data needs, intercity passenger rail, connections between rural transportation and public health, and rural transportation safety.

3.4 Additional Transportation Equity Resources

Many additional entities have generated and compiled resources that may be helpful to rural transportation practitioners interested in learning more about equity. The following resources may serve as a helpful starting point but should not be considered exhaustive.

Several State DOTs have led in the development of equity planning and practice. For example, FHWA’s Office of Safety (FHWA 2023a) recently highlighted the following noteworthy practices:

- California: Integrating the Safe System Approach and Equity into California’s Strategic Highway Safety Plan (FHWA 2023b).
- Minnesota: MnDOT’s SPACE Tool: Using Equity Data to Inform Active Transportation Safety (FHWA 2023c).
- Virginia: “E is for Everybody”: Using Equity to Prioritize Pedestrian Safety Projects and Make the Case for Greater State Funding (FHWA 2023d).

In addition, (as discussed further below in this section) several State DOTs have worked with the State Smart Transportation Initiative on accessibility and equity measurements and planning,

¹⁴ See the Committee’s webpage for more information: <https://www.nationalacademies.org/our-work/data-metrics-and-analytic-methods-for-assessing-equity-impacts-of-surface-transportation-funding-programs>.

including work on Virginia’s Smart Scale, Delaware’s sidewalk improvement assessments, Minnesota’s impact assessments, and Washington State’s multimodal accessibility program.¹⁵

The Institute of Transportation Engineers (ITE) recently formed an Equity Committee “to develop tools, advocate, educate, and set a leadership example in our profession in making transportation equity a priority and changing the future of mobility for all users.” ITE produced a background on transportation equity and the Equity Committee for its QuickBite series, as well as an Equity Glossary, and a compilation of case studies.¹⁶

The National Association of City Transportation Officials (NACTO) is an association of 96 major North American cities and transit agencies that share ideas, insights, and practices and cooperatively approach national transportation issues. Its mission is “to build cities as places for people, with safe, sustainable, accessible, and equitable transportation choices that support a strong economy and vibrant quality of life.”¹⁷ NACTO has generated a variety of resources to support transportation equity, including:

- Walkable Station Spacing is Key to Successful, Equitable Bikeshare (NACTO 2015a).
- Can Monthly Passes Improve Bike Share Equity? (NACTO 2015b).
- Equitable Bike Share Means Building Better Places for People to Ride (NACTO 2016).
- Designing for All Ages & Abilities (NACTO 2017).
- Breaking the Cycle: Reevaluating the Laws that Prevent Safe & Inclusive Biking (NACTO 2022a).
- Moving Together: Collaborating with Communities for More Equitable Outcomes (NACTO 2023a).
- Complete Connections: Building Equitable Bike Networks (NACTO 2023b).

NACTO also collaborated with the Better Bike Share Partnership to launch the 2022-2023 Transportation Justice Fellowship Program in recognition of “the need to invest resources to support and sustain the people doing the heavy work to operationalize equity across the transportation field” (NACTO 2022b).¹⁸

Smart Growth America (SGA) is a nonprofit organization that conducts technical assistance, advocacy, and thought leadership, and focuses on three priorities: climate change and resilience, advancing racial equity, and creating healthy communities. Over the past three years, SGA has held an annual Equity Summit; the agendas and recordings, as well as discussion guides, for all of the summits are available online (SGA 2021, 2022, 2023). Transportation for America (TfA) is a program of SGA and has produced several advocacy reports related to transportation equity,

¹⁵ For more information, see the State Smart Transportation Initiative website: <https://ssti.us/accessibility-analysis/#guide> and <https://ssti.us/equity/>.

¹⁶ For more information, see the ITE website: <https://www.ite.org/technical-resources/councils/equity-committee/>.

¹⁷ For more information, see the NACTO website: <https://nacto.org/about/>.

¹⁸ For more information about the Transportation Justice Fellowship Program see: <https://nacto.org/2022-transportation-justice-fellowship/> and <https://nacto.org/2023/05/09/nactos-transportation-justice-fellows-put-equity-into-action/>.

including the Dangerous by Design report series (TfA 2022; prior editions in the series were published in 2009, 2011, 2014, 2017, 2019, and 2021) as well as the newly released Divided by Design report (TfA 2023). The State Smart Transportation Initiative (SSTI) is another SGA program that has focused research, technical assistance, and information-sharing efforts on equity and accessibility, including publication of a practitioner’s guide for measuring accessibility (SSTI 2021). As mentioned earlier in this section, SSTI has worked with several State DOTs to advance their practice of equity and accessibility analysis (SSTI 2023), including Virginia’s Smart Scale, which has been recognized as a leading example of project prioritization among State DOTs (Noyce, McCahill, Sundquist, and Chitturi 2021).

TransitCenter is a foundation “that works to secure a more just and sustainable future with abundant public transportation options” and conducts targeted research and advocacy “to persuade leaders to make better choices that center both climate and justice outcomes in transportation.”¹⁹ TransitCenter has produced reports, articles, and videos relating to equity. Key resources produced by TransitCenter with a focus on equity include:

- Equity in Practice: A Guidebook for Transit Agencies (TransitCenter 2021a)
- Transit Equity Dashboard (TransitCenter 2021b)
- Safety for All (TransitCenter 2021c)

The Victoria Transport Policy Institute (VTPI) is an independent research organization that produces resources to “help improve transportation planning and policy analysis” and is dedicated to efficiency, equity, and clarity.²⁰ VTPI has produced several resources focused on transportation equity, including:

- Evaluating Transportation Equity: Guidance for Incorporating Distributional Impacts in Transport Planning (Litman 2022; VTPI 2023)
- Increasing Equity: Strategies That Are Particularly Helpful for Achieving Equity Objectives (VTPI 2018)

Finally, the Shared Use Mobility Center is “a public-interest organization dedicated to achieving equitable, affordable, and environmentally sound mobility across the US through the efficient sharing of transportation assets” and its Mobility Learning Center offers a searchable database with a topical filter available to find equity-related resources (SUMC 2023).²¹

¹⁹ For more information, see TransitCenter’s webpage: <https://transitcenter.org/about/> and <https://transitcenter.org/tag/equity/>.

²⁰ For more information, see VTPI’s home webpage: <https://www.vtpi.org/>.

²¹ For more information, see the Shared Use Mobility Center’s webpage: <https://sharedusemobilitycenter.org/mission-vision/> and <https://learn.sharedusemobilitycenter.org/>.

4 Measures

This section provides an overview of measurement tools that have been developed to operationalize the concept of equity, with a focus on equity assessment and prioritization of investments that support equity in the context of transportation policy and planning. Many of these tools may serve as useful resources for rural transportation practitioners interested in better assessing and prioritizing equity in their own communities.

4.1 Civil Rights Laws, Administrative Directives, and Equity Analysis

As discussed above in **Section 3.1** and **3.2**, transportation agencies are legally required to comply with federal civil rights laws. Meanwhile, Executive Orders relating to equity and environmental justice serve as administrative directives to the Federal Government, including USDOT. TCRP Research Report 214 (Twaddell and Zgoda, 2020) and the FTA Report No. 0249 on Practical Measures for Advancing Public Transit Equity and Access (Karner, Levine, Dunbar, and Pendyala 2023) both provide helpful overviews of the legal and policy context for equity analyses.

As discussed in **Section 2**, the concepts of equity, environmental justice, and accessibility are distinct but closely related; the discussion in **Section 3** relayed some of the interrelated resources developed by entities, such as USDOT, charged with implementing and operationalizing them. In the remainder of this section, we will focus on recent developments of tools for measuring equity as broadly conceived, inclusive of information that may support nondiscrimination, environmental justice, and accessibility considerations. We acknowledge there are specific legal requirements for conducting Title VI and ADA analyses and achieving compliance, and direct interested transportation practitioners to the resources in **Section 3** (including the Civil Rights Division of USDOJ as well as USDOT) for more specific guidance.

Finally, but on a related note, rural transportation practitioners should consult legal experts for questions regarding legal liabilities. It is important to acknowledge that efforts to improve transportation equity measurements may lead to liability questions.²² A better understanding of existing transportation inequities in a community may negate or render ineffective a legal defense based on ignorance of existing conditions. Nevertheless, developing a clear and transparent policy for incorporating transportation equity measurements into the transportation investment prioritization process may not only offer a better legal defense than one based on ignorance of inequities, but support an overall improved transportation investment process that builds public support rather than diminishes it. There is generally an understanding in U.S. society that not all problems can be fixed everywhere at once, but ‘openly engaging with difficult tradeoffs and explicitly justifying choices is the mark of well-functioning governments’ (Martens 2017, p. 7) and may demonstrate (in a legal as well as broader community context) a good-faith effort to address inequities.

²² The contents of this paragraph are adapted from comments made during the expert panel discussion in “Sidewalk Inventories: A Tool for Equity and ADA Compliance,” a webinar convened by the Pedestrian and Bicycle Information Center and America Walks (PBIC 2023) on July 26, 2023.

4.2 Tools for Measuring Transportation Equity

This section highlights tools for measuring transportation equity, with a focus on capturing the latest developments to collect and analyze transportation equity data. They are intended to serve as a helpful starting point, but are not exhaustive, as assessing transportation equity is an active and growing area of transportation research, policy, and practice. For more detailed guidance on the technical aspects of measuring equity and accessibility, see the overviews by SSTI (2021) and Karner, Levine, Dunbar, and Pendyala (2023).

The working definition of equity, “fairness in the distribution of benefits and burdens” (Williams, Kramer, Keita, and Boyd 2020; see **Section 2.2** above for discussion of the conceptualization of equity), guides the following discussion of tools. Fairness in transportation planning requires an understanding of the people impacted by projects (e.g., underserved persons, underserved communities, and persons at risk of transportation disadvantage or those already experiencing it) as well as the impacts of existing and/or proposed transportation projects (see Twaddell and Zgoda, 2020, pp. 6-7, for a helpful overview of terms to describe populations considered for equity analyses as well as a five-step equity analysis process).

4.2.1 Tools to Identify People and Places for Equity Considerations

Fairness in the distribution of benefits and burdens of transportation systems and services requires identification of underserved people and communities as well as people experiencing or at risk of transportation disadvantage. Several tools have been developed to improve and make more comprehensive efforts to identify populations and places deserving of equity considerations, and many state and national datasets use information at the Census Tract level. One such tool is the Equitable Transportation Community Explorer (ETCE), an interactive web application “to explore the cumulative burden communities experience, as a result of underinvestment in transportation” that is “designed to complement the White House Council on Environmental Quality (CEQ) Climate & Economic Justice Screening Tool (CEJST)²³ by providing users deeper insight into the transportation disadvantage component of CEJST” (BTS 2023). The ETCE is a national dataset that uses 2020 Census Tracts and includes interactive dashboards to view data at different geographic levels. It is one of the featured resources available from the Intersections – Transportation Data + Equity Hub (BETA) for transportation equity data that is currently under development and live in beta form from USDOT BTS.

Another model tool was developed by researchers at UCLA’s Center for Neighborhood Knowledge, in partnership with the California Air Resources Board (CARB) and with support from the California Initiative for Health Equity and Action: the Transportation Disparities Mapping Tool. It was designed to help users “better understand transportation disparities and built environment-related determinants of health in California” (CNK 2021) and incorporates California’s major indicators of transportation disparities as well as built environment

²³ The Climate & Economic Justice Screening Tool was developed as a result of Executive Order 14008 of January 27, 2021, on Tackling the Climate Crisis at Home and Abroad and features an interactive map and datasets for indicators of burdens at the Census Tract level across eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development (CEQ 2022).

determinants of health. It also provides “useful indicators for CARB and other organizations to help fulfill state mandates related to climate change, greenhouse gas emissions, and environmental justice, and to evaluate progress towards a more sustainable and environmentally just future” (CNK 2021). This tool may be used in conjunction with the CalEnviroScreen indicators, developed by the California Office of Environmental Health Hazard Assessment, which are grouped into exposures, environmental effects, sensitive populations, and socioeconomic factors (CAOEHHA 2023).

Another important contribution to transportation equity analysis was developed by researchers at the University of Michigan’s Poverty Solutions program, with support from the National Science Foundation, Stanford University’s Center on Poverty and Inequality, and several entities across the University of Michigan. The Transportation Security Index (TSI) is “the first validated measure of transportation security that offers insights into who experiences transportation insecurity and enables researchers and practitioners to determine which interventions can improve this condition” (UMI 2023). The TSI is available as a questionnaire and can be administered by policymakers, planners, practitioners, and researchers for a variety of use cases, including documenting the prevalence of transportation insecurity, identifying geographic hotspots of transportation insecurity, evaluating potential transportation interventions, and intake screening for social services (UMI 2023).

One of the key challenges of measuring transportation equity, especially for those outside of private vehicles, relates to a lack of uniform data standards. The Transportation Data Equity Initiative (TDEI) is directly addressing this challenge. TDEI is a project from the Taskar Center for Accessible Technology at the University of Washington and the Washington State Transportation Center, with sponsorship from The Complete Trip ITS4US Deployment Program at USDOT. TDEI “aims to provide more equitable mobility benefits by collecting and providing infrastructure to sustainably support open data about sidewalks, transit paths, and on-demand transit services” (TCAT 2023). One of TDEI’s key areas of focus is development of access-first data standards, and the OpenSidewalks project is an example of these standards with respect to pedestrian data:

The OpenSidewalks project attempts to address this problem [of no standard pedestrian data format] by suggesting standardized, transportation network-focused methods for gathering detailed information such as sidewalks, curb cuts, crossings, and street furniture through community engagement and crowdsourcing. (TCAT 2023)²⁴

Finally, several tools have been developed to measure access to opportunities using various transportation modes. The University of Minnesota’s Accessibility Observatory (CTS 2023) has been a leading contributor in the measurement of access to destinations by mode, and “is the only organization in the nation focused on measuring transportation accessibility rather than congestion” (CTS 2023). The Access Across America annual report series estimates job accessibility in major U.S. cities by auto, transit, biking, and walking and serves as a tool for

²⁴ The OpenSidewalks project was recently featured in the July 26, 2023, webinar on “Sidewalk Inventories: A Tool for Equity and ADA Compliance” convened by the Pedestrian and Bicycle Information Center and America Walks (PBIC 2023).

benchmarking differences across a region as well as changes over time. Another tool, focused specifically on public transportation, was developed by TransitCenter, in collaboration with research, consulting, and community partners. The Transit Equity Dashboard “evaluates access to opportunity on public transit with several measures, including number of jobs, low-wage jobs, or amount of park space” and “also shows access to opportunity in terms of the travel times to nearby grocery stores, hospitals, urgent care facilities, pharmacies, and colleges or universities” for seven major urban areas in the U.S.: Boston, Chicago, Los Angeles, New York, Philadelphia, San Francisco-Oakland, and Washington, D.C. (TransitCenter 2021d).²⁵ The Urban Institute also analyzed transportation system inequities in four metropolitan areas: Baltimore, Lansing, Nashville, and Seattle (Urban Institute 2020). Karner, Levine, Dunbar, and Pendyala (2023) provide a helpful overview of several different types of accessibility measurements, including discussion of their strengths and limitations, case studies and examples for how to calculate them, and practitioner guidance for selecting between them.

4.2.2 Tools to Measure the Impacts of Projects

Fairness in the distribution of benefits and burdens of transportation systems and services also requires measurements of the impacts of projects, and a number of tools have been developed to improve project impact estimates for equity considerations.

The Federal Highway Administration (FHWA) at USDOT developed the Screening Tool for Equity Analysis Projects (STEAP) to assist with the “rapid screening of potential project locations anywhere in the United States to support Title VI, environmental justice (EJ) & other socioeconomic data analyses” (FHWA 2023e). The tool incorporates American Community Survey 2016-2020 5-Year Estimates as well as information from the 2020 Decennial Census. STEAP is designed to be user friendly and “allows FHWA, state DOTs, MPOs or other local agencies to generate equity analysis project profile reports without the need for GIS specialists to perform the work” (FHWA 2023e).

Another helpful tool was developed by researchers at the University of South Florida’s Center for Urban Transportation Research with support from the University of Texas at Arlington’s Center for Transportation, Equity, Decisions & Dollars (CUTR 2021). The Transportation Equity Toolkit is comprised of the Transportation Equity Audit Tool (a survey-based tool to identify community transportation needs), and the Transportation Equity Scorecard Tool (a spreadsheet-based tool to assist MPOs and transportation agencies with project prioritization; see also Williams, Kramer, Keita, and Boyd 2020). The Scorecard Tool aims “to advance transportation projects for funding based on the extent to which they directly advance the needs of underserved populations” and incorporates factors organized into the following categories: Access to Opportunity; Health and Environment; Safety and Emergency Evacuation; Affordability; Mobility; and Burdens (Williams, Kramer, Keita, and Boyd 2020).

Another innovative tool for measuring project impacts was developed by the Center for Neighborhood Technology and the Chicago area’s Metropolitan Planning Council for all parcels within Cook County, IL. The Equitable Transit-Oriented Development Calculator allows

²⁵ See Klumpenhouwer, Allen, Li, et al (2021) for more information.

developers to “fully customize the design of a building plan to see how different characteristics might affect the surrounding community and what transit benefits will be available to potential future residents” (CNT 2022). It may serve as a helpful example for other areas interested in pursuing equitable transit-oriented development, including rural communities.

Table 2 provides a summary of the tools discussed in **Section 4.2.1** and **4.2.2**. Our hope is that these tools may serve as a helpful starting point for rural transportation practitioners interested in familiarizing with the practice of measuring transportation equity.

Table 2. Tools for Measuring Transportation Equity

Organization	Tool Name	Geography	Focus/ Strengths	Webpage
Accessibility Observatory	Access Across America	Metropolitan Areas	Accessibility by Mode	https://access.umn.edu/
Bureau of Transportation Statistics	Intersections - Transportation Data + Equity Hub (BETA)	National/Nonspecific	Resource Hub, Equitable Transportation Community Explorer	https://equity-data.dot.gov/
Center for Neighborhood Knowledge	Transportation Disparities Mapping Tool	California	Transportation and Health	https://knowledge.luskin.ucla.edu/2021/05/14/prototype-transportation-disparities-mapping-tool/
Center for Neighborhood Technology	Equitable Transit-Oriented Development Calculator	Cook County, IL (Chicago)	Developers, Project Development	https://etod.cnt.org/
Center for Urban Transportation Research	Transportation Equity Toolkit	National/Nonspecific	Project Prioritization	https://www.cutr.usf.edu/2021/09/transportation-equity-toolkit/
Federal Highway Administration	Screening Tool for Equity Analysis of Projects	National (Major Roadways, Block Groups)	Project Screening	https://hepgis.fhwa.dot.gov/fhwagis/buffertool/
Poverty Solutions	Transportation Security Index	National/Nonspecific	Individual-Level, Poverty	https://poverty.umich.edu/research-funding-opportunities/data-tools/the-transportation-security-index/
Taskar Center for Accessible Technology	Transportation Data Equity Initiative	National/Nonspecific	Data Standards	https://transitequity.cs.washington.edu/
TransitCenter	Transit Equity Dashboard	7 Major Urban Areas	Transit Access	https://dashboard.transitcenter.org/

Source: We used publicly available databases and information in the form of published reports, articles, and presentations to compile this table to feature tools for measuring transportation equity, with a focus on recent developments.

5 Reforms

This section provides an overview of innovative policies and programs that have been developed to support transportation equity. These policies and programs may provide helpful models or starting points for rural transportation practitioners interested in piloting programs to support transportation equity in their communities.

5.1 Reforms to Support Expanded Access to Travel

In the past several years, a growing number of communities have been implementing programs to support improved and more varied travel options, with transportation equity serving as a key motivating factor. In this section, we highlight four examples: 1) universal basic mobility programs; 2) capping or eliminating transit fares; 3) car ownership subsidy programs; and 4) electric bicycle ownership subsidy programs.

5.1.1 University Basic Mobility and Mobility Wallets

Universal basic mobility (“UBM”) is a concept closely related to universal basic income – but specific to transportation. The goals of UBM programs typically relate to combating accessibility poverty and transportation disadvantage and ensuring a minimum guaranteed level of transportation (see, e.g., Martens 2017, Ward and Walsh 2023). Pilot programs around the country have varied in terms of specific stipend amounts and eligibility rules for individuals and transportation modes, but they are often multimodal in nature. They may also include support for trips on public transportation and shared modes (e.g., cars, rides, bikes, scooters) via a monthly stipend issued to a mobility wallet platform that serves as a hub for subsidies, payments, and reservations – or free access to a multimodal suite of transportation services. Notable pilot programs include those in Los Angeles²⁶, Pittsburgh, and Portland, and researchers are actively working to evaluate the outcomes of several pilot programs.²⁷ Researchers at the National Institute for Transportation and Communities at Portland State University evaluated Portland’s Transportation Wallet program for affordable housing residents, and found increased and more varied tripmaking, as well as reduced travel-related stress afforded by greater flexibility and convenience in travel (Tan, McNeil, MacArthur, and Rodgers 2021, McNeil, MacArthur, and Tan 2021).

The transportation context in which the UBM programs operate is important, as the feasibility of trips via alternatives to private vehicles can vary significantly based on land use patterns and characteristics of the built environment. Indeed, “providing access to just transit and other wonderful-yet-slow modes like bikeshare may not meaningfully change the accessibility landscape for people who are receiving [universal basic mobility support]” (Bliss 2021). Nevertheless, proponents of universal basic mobility anticipate the programs may play a significant role in participants “being able to meet [their] potential in society” (Bliss 2021).

²⁶ For more information about the Los Angeles UBM suite of programs, see: <https://ladot.lacity.org/ubm>.

²⁷ For example, researchers at UC Davis are evaluating the UBM pilot projects in Oakland and Bakersfield: <https://www.ucits.org/research-project/2022-20/>. Meanwhile, researchers at UCLA are evaluating the UBM wallet program in Los Angeles: <https://www.its.ucla.edu/project/evaluation-of-a-large-scale-universal-basic-mobility-wallet-in-south-los-angeles/>.

5.1.2 Capping or Eliminating Transit Fares

In recent years, fare-capping and fare-free transit has received growing attention as communities seek to reduce barriers to riding public transportation. Fare-capping refers to a mechanism whereby an individual pays for transit per trip until the cost of a pass (e.g., daily, weekly, monthly) is reached, after which no further per trip charges are assessed. Transit agencies that set up fare-capping eliminate the inequities built into discounted pass programs that require a large upfront expenditure (which may be difficult for low-income individuals to amass and allocate). Modern fare collection systems have made fare-capping more feasible and seamless. TCRP Synthesis 160 is dedicated to the topic of balancing the revenue and equity impacts of fare-capping (Pettine, Rosenblum, and Manford 2022, see also Hightower, Ziedan, Crossland, and Brakewood 2022). Meanwhile, a growing number of transit agencies that previously collected fares have considered eliminating them altogether. TCRP Research Report 237 provides an evaluation framework for transit agencies working through the considerations of going fare-free (Kirschen, Pettine, and Adams 2023).

5.1.3 Car Ownership Subsidy Programs

The challenge of navigating most U.S. communities without a car relates to what King, Smart, and Manville (2022) call “the poverty of the carless.” They note with nuance that “America’s car-oriented built environment” has generated “the burden of keeping a car and the income penalty associated with not doing so” (see also, e.g., Klein 2020, Coren, Lowe, and Barajas 2022, and Klein, Basu, and Smart 2023) such that “a just and sustainable society would help [the small group of people who need vehicles and lack them] drive more while encouraging [the large group who have vehicles and use them needlessly] to drive less” (King, Smart, and Manville 2022). This relates to another potential approach to addressing transportation equity – support for access to vehicles, either through subsidies for carsharing programs or the direct purchase of vehicles. Klein (2020) evaluated the impact of subsidized car ownership, interviewing 30 individuals in Virginia and Maryland who paid less than \$1,000 for a car through the nonprofit Vehicles for Change²⁸, and found that “interviewees described how access to a car enabled economic mobility and expanded their access to neighborhoods, education, shopping, and health care.” The author argues for near-term policies to support low-income car ownership subsidy programs while working “to create a more just and environmentally sustainable transportation system” – acknowledging that, “given the decades spent building the system of automobility, unwinding it will not be quick” (Klein 2020).

²⁸ For more information about Vehicles for Change, see: <https://www.vehiclesforchange.org/>.

5.1.4 Electric Bicycle Ownership Subsidy Programs

Electric bicycles lower the rider burden in a variety of ways, including those associated with hauling cargo (e.g., children, groceries) and managing exertion (e.g., riding long distances, climbing over steep topography, or riding in strong wind or excessive heat). As a result, they have the potential to serve a wider range of travel needs than conventional bicycles and may even serve in place of private vehicles for some travel. This has important equity implications, because the ownership, maintenance, and charging costs of electric bicycles are approximately an order of magnitude lower than the ownership, maintenance, and fueling costs associated with private vehicle travel (Bennett, MacArthur, Cherry, and Jones 2022). However, the retail prices of most electric bicycles have generally made them inaccessible to low-income households. In the face of their strong potential to support transportation, health, environmental, and equity goals, a growing number of communities and states across the U.S. have created electric bicycle purchase incentive programs. The Transportation Research and Education Center (TREC) at Portland State University is a national leader in electric bicycle research and has an active program to track incentive programs.²⁹ In a white paper on electric bicycle incentive programs, TREC researchers noted that:

Many existing programs seek to assist marginalized and underserved communities through income-qualification and tiered benefits for lower income levels. However, there are additional ways in which programs can address social justice needs, including geographic or demographic targeting and context-sensitive program design. (Bennett, MacArthur, Cherry, and Jones 2022)

The researchers go on discuss how incentive programs may be targeted to support electric bicycle access for persons underrepresented in U.S. cycling or for persons who may especially benefit from expanded travel opportunities (Bennett, MacArthur, Cherry, and Jones 2022). Another mechanism for increasing access to electric bicycles is via public bikeshare programs, with targeted support for electric bicycle use in the shared fleet – which in many cases come with higher usage charges.

5.2 Reforms to Improve Travel Conditions

While the reforms discussed in **Section 5.1** focus on expanding access to travel options, another method of supporting transportation equity focuses on improving travel conditions. In the past several years, a growing number of communities have done just that. This section highlights three examples: 1) sidewalk network improvements; 2) transit improvements; and 3) traffic calming.

²⁹ TREC maintains the E-Bike Incentive Programs in North America table via a web-based spreadsheet, available online: https://trec.pdx.edu/e-bike-research/#5863/E_Bike_Incentive_Programs_in_NA.

5.2.1 Sidewalk Network Improvements

Pedestrian infrastructure is receiving increasing attention among transportation researchers and practitioners who are motivated by concerns about transportation inequities (including widespread failures to comply with the ADA), as well as vast sidewalk maintenance backlogs, increasing pedestrian fatality and serious injury trends, and a growing interest in supporting active and affordable travel options. Across the U.S., pedestrian infrastructure is often “discontinuous, inaccessible to those with physical disabilities, and poorly maintained” (Rowangould and Corning-Padilla 2018). To improve sidewalk networks, efforts have recently focused on two key elements: 1) sidewalk data collection and inventorying (see, e.g., Coppola, Marshall, and Janson 2021, PBIC 2023, TCAT 2023, Karner, Levine, Dunbar, and Pendyala 2023); and 2) new approaches to sidewalk funding and assignment of responsibilities for building and maintaining them (Rowangould and Corning-Padilla 2018). Sidewalk data collection efforts help to make communities less reactive (e.g., responding to complaints) and more proactive (e.g., conducting systematic inventories and developing prioritization plans) (PBIC 2023), and access-first data standards like those developed by the OpenSidewalks project (TCAT 2023) are an important contribution toward standardizing high quality pedestrian infrastructure data and modernizing sidewalk asset management (PBIC 2023, see also the discussion in **Section 4.2.1**). In terms of funding and the assignment of responsibilities for sidewalks, there is growing debate and criticism regarding the historic reliance on adjacent property owners – on equity as well as safety and efficacy grounds. Rowangould and Corning-Padilla (2018) point out that it is standard for U.S. municipalities to maintain roads and streets, but most require residents to maintain and repair adjacent public sidewalks. They evaluated alternative financing options for maintaining public sidewalks and found that the gross receipts tax, gas tax, or property tax would all be an improvement over the current system of relying on adjacent property owners (Rowangould and Corning-Padilla 2018). In 2022, voters in Denver approved an ordinance to shift responsibility for sidewalk maintenance to the city, and in 2023 Chicago’s City Council passed an ordinance to pilot a sidewalk winter maintenance program in six zones.³⁰

5.2.2 Transit Improvements

Public transportation improvements have the potential to support transportation equity if fairness guides the distribution of benefits. This is especially the case because underserved communities and low-income persons and households tend to rely on public transportation more than other segments of society – in large part due to the high costs associated with private vehicle travel and the comparable affordability of transit. Two strategies for improving public transportation are bus network redesigns (the subject of TCRP Synthesis 140) and the package or bundle of service characteristics known as Bus Rapid Transit (the subject of TCRP Synthesis 164) – which include features such as prioritization of transit vehicles at controlled intersections and dedicated rights-

³⁰ For more information, see <https://denverstreetspartnership.org/project/denver-transportation-officials-ask-for-10-million-to-implement-sidewalk-ballot-measure/> and <https://www.nbcchicago.com/news/local/chicago-politics/chicago-to-explore-pilot-program-for-clearing-sidewalks-of-snow-ice/3190248/>.

of-way that vastly improve transit vehicle travel times and make them more competitive with alternatives.³¹

5.2.3 Traffic Calming

Finally, increasing adoption of the Safe System Approach and accompanying Complete Streets and Vision Zero policies has identified traffic calming and related strategies, such as road diets (also called roadway reconfigurations), as important means of improving travel conditions for those traveling outside of motorized vehicles (ie nonoccupants or vulnerable road users). These measures tend to support transportation equity because underserved people and communities rely on walking and bicycling more than other segments of society (as is the case with public transportation), and they are overrepresented in nonoccupant motor vehicle crashes, including pedestrian fatalities and serious injuries (Transportation for America 2022).

5.3 Additional Reforms to Support Transportation Equity

There are a wide variety of additional reforms that communities may consider when supporting transportation equity. These include equity-oriented approaches to emergency management and disaster response planning, reallocation of public rights-of-way to improve pedestrian and bicyclist safety, and reforms in parking and road use management and pricing. For example, TRB recently hosted a webinar featuring research on “Community-Based and Equitable Transportation Response in Disaster” that covered equitable transportation planning around flooding and wildfires (TRB 2023g). Meanwhile, a growing number of communities across the U.S. have adopted reforms that update the quantity of parking required around new developments or transit, or eliminate parking minimums altogether. This has multifaceted impacts on equity as new space becomes available for affordable housing, local businesses, and open space.³² In addition, parking and road pricing have been considered as tools to support transportation equity. The City of Portland’s Pricing Options for Equitable Mobility (POEM) Task Force is a notable example of a comprehensive effort to update a community’s parking policy while prioritizing equity considerations (PBOT 2023). Parking and road pricing may generate revenue that supports programs and services for underserved populations and the transportation disadvantaged.

³¹ There is ongoing debate regarding whether fare-free transit (see **Section 5.1.2**) or service improvements would better serve transportation equity, with advocates for the latter arguing that poor quality transit that is fare-free does not support transportation equity as much as high quality fare-based transit does.

³² For more information, see the Parking Reform Network: <https://parkingreform.org/>. California also passed a law to eliminate parking mandates near public transportation in 2022: <https://www.latimes.com/california/story/2022-09-23/newsom-bill-banning-parking-requirement-transit-housing-climate-change>.

5.4 Concluding Remarks

We hope this overview of innovative policy and program reforms conveys the range of equity supporting opportunities available to rural transportation practitioners. While the examples have primarily come from larger cities, rural communities should feel empowered to pursue transportation policies and programs that align with their community's values and regional context. In many cases, it may be easier for rural communities to pilot a small program and evaluate the outcomes than it is for larger cities with more complex bureaucratic structures.

With this report, we hope rural transportation practitioners feel more informed about transportation equity concepts, resources, tools, and reforms, and empowered to support transportation equity policies and programs for fairness and justice in their communities.

Appendix 1: University Transportation Centers With a Focus on Equity and/or Environmental Justice

Notably, a wide variety of additional University Transportation Centers contribute to the study and practice of equity, environmental justice, and/or accessibility. That is, the UTC program's contributions on these subjects are not limited to the efforts of the UTCs listed in **Table 3**. Rather, this may serve as a helpful starting point.

Table 3. University Transportation Centers with a Focus on Equity, Environmental Justice, and/or Accessibility

Name	Lead University	Type	Authorization
Urban Mobility and Equity Center	Morgan State University (https://www.morgan.edu/umec)	Tier 1	FAST Act
Center for Safety Equity in Transportation	University of Alaska Fairbanks (https://cset.uaf.edu/)	Tier 1	FAST Act
Center for Transportation Equity, Decisions and Dollar	University of Texas at Arlington (https://ctedd.uta.edu/)	Tier 1	FAST Act
Sustainable Mobility and Accessibility Regional Transportation Equity Research Center	Morgan State University	Regional (Region 3)	BIL
Mid-America Transportation Center for Transportation Safety and Equity	University of Nebraska Lincoln	Regional (Region 7)	BIL
Coastal Research and Education Actions for Transportation Equity	Texas State University	Tier 1	BIL
Environmentally Responsible Transportation Center for Communities of Concern	University of Missouri Kansas City	Tier 1	BIL

Source: <https://www.transportation.gov/content/university-transportation-centers>.

Appendix 2: TRB Standing Committees and Research Projects With a Focus on Equity and/or Environmental Justice

As mentioned above in Section 3.3, TRB’s recent committee restructuring process resulted in the Standing Committee on Environmental Justice (ADD50) becoming the Standing Committee on Equity in Transportation (AME10). The term “environmental justice” is no longer included in any Standing Committee names. **Table 4** summarizes the scopes of the TRB Standing Committees specifically focused on equity, environmental justice, and/or accessibility, and **Table 5** lists the TRB Cooperative Research Program projects directly focused on equity, environmental justice, and/or accessibility. Notably, a wide variety of additional TRB Committees and Cooperative Research Program projects contribute to the study and practice of equity, environmental justice, and/or accessibility, including those focused on topics such as road pricing, public transportation fare policy, and bicycle and pedestrian safety (see, e.g., the list of Cosponsoring Committees for the Conference on Advancing Transportation Equity in TRB 2022, pp. 13-14). That is, TRB’s contributions on these subjects are not limited to the information in **Table 4** and **Table 5**. Rather, these tables may serve as a helpful starting point.

Table 4. TRB Standing Committees With a Scope Dedicated to Equity, Environmental Justice, and/or Accessibility

Committee	Code	Scope	Topic Codes
Standing Committee on Equity in Transportation	AME10	Practices, policies, and research needs to provide access to options of reliable, affordable transportation to all transportation users, including users in rural, low-density, low-income, and disadvantaged communities. It also considers transportation practices and research affecting health, cultural, social, and economic factors of sustainable mobility through localities and regions.	Environment Policy Society
Standing Committee on Accessible Transportation and Mobility	AME50	Problems relating to the transportation disadvantaged and the services that various modes of transportation should provide for them as well as an assessment of the impact and value of programs directed at improving their mobility.	Passenger Transportation Pedestrians and Bicyclists Policy Public Transportation Safety and Human Factors Society
Standing Committee on Contracting Equity	AJE60	Issues related to the involvement of Disadvantaged Business Enterprises (DBEs) in the transportation industry. It is especially interested in strategies associated with achieving the objectives of the USDOT DBE program.	Construction Design Highways Policy Society

Table 5. TRB Cooperative Research Program Research Projects With a Focus on Equity, Environmental Justice, and/or Accessibility

Project Number	Project Title	Status	Year(s)
ACRP 02-99	Incorporating Environmental Justice and Equity Principles and Data into Airport Decision-Making	Active	2022-2023
ACRP 11-03/Topic S04-19	Incorporating ADA and Functional Needs in Emergency Exercises	ACRP Synthesis 90	2017-2019
NCHRP 08-41	Effective Methods for Environmental Justice Assessment	NCHRP Report 532	2001-2004
NCHRP 08-100	Environmental Justice Analyses When Considering Toll Implementation or Rate Changes	NCHRP Research Report 860	2014-2016
NCHRP 08-150	Tools to Integrate Equity into Active Transportation and Safety Investments	Pending	NA
NCHRP 08-152	Strategies for Improving Diversity, Equity, and Inclusion in the Transportation Planning Profession	Active	2023-2024
NCHRP 08-159	How to Assess and Address Equity of Access to Essential Goods and Services	Pending	NA
NCHRP 08-169	Valuing Diversity, Equity, and Inclusion in Transportation Asset Management	Pending	NA
NCHRP 08-177	Digitizing Bicycle and Pedestrian Treatments for Promoting Active Transportation Equity and Safety	Anticipated	NA
NCHRP 19-22	Equity Impacts of Transportation Revenue Mechanisms and Changing Trends	Pending	NA
NCHRP 20-07/Task 167	Development of Recommended Revisions to Draft ADA Guidelines for Accessible Rights of Way	Completed (Contractor's Final Report)	2003-2004
NCHRP 20-07/Task 249	Asset Management Approaches to ADA Compliance	Completed (Contractor's Final Report)	2008
NCHRP 20-102 (30)	Equity Impacts of Shared AVs on Transportation Disadvantaged Communities	Combined with TCRP Project B-47 Mobility Inclusion for Underserved Population with the Emerging Technologies	2019-2023
NCHRP 20-123 (19)	A Research Roadmap for Institutionalizing Transportation Equity	Pending	NA
NCHRP 20-65/Task 59	The Determination of How Federal Section 5316 Funds Were Used Under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy For Users (SAFETEA-LU) and The Transportation Equity Act For The 21st Century (TEA 21)	Completed (Contractor's Final Report)	2014-2015

Project Number	Project Title	Status	Year(s)
NCHRP 20-65/Task 71	Transit Network Balance; Efficiency and Equity	Completed (Contractor's Final Report)	2016-2017
NCHRP 23-13 (06)	Assessing the Equity and Workforce Mobility Implications of the Expansion of E-Commerce and Direct-to-Consumer Delivery Services	Active	2022-2024
NCHRP Synthesis 20-05/Topic 53-01	Practices to Promote Equity in Transportation Funding	Active (Synthesis)	2022-2023
NCHRP Synthesis 20-05/Topic 54-20	Advancing Gender Equity in the DOT Workforce	Active (Synthesis)	2023
TCRP B-28	Improving ADA Complementary Paratransit Demand Estimation	TCRP Report 119	2004-2006
TCRP B-28A	Improving ADA Complementary Paratransit Demand Estimation – Phase II: Regional Travel Demand Forecasting	TCRP Report 158	2008-2012
TCRP B-34	Guidebook for Commingling ADA-Eligible and Other Passengers on ADA-Complementary Paratransit Services	TCRP Report 143	2006-2011
TCRP F-13	Vehicle Operator Recruitment, Retention, and Performance in ADA Complementary Paratransit Services	TCRP Report 142	2007-2009
TCRP H-54	Guide to Equity Analysis in Regional Transportation Planning Processes	TCRP Research Report 214 Vol. 1 & Vol. 2	2016-2019
TCRP H-59	Racial Equity, Black America, and Public Transportation	Active	2021-2023
TCRP H-60	Lessons Learned from Covid-19: Strategies to Enhance Racial and Social Equity Through Public Transportation As A Community Lifeline	Active	2021-2023
TCRP Synthesis J-07/Topic SA-52	Assessing Equity and Identifying Impacts Associated with Bus Network Redesigns	TCRP Synthesis 159	2020
TCRP Synthesis J-07/Topic SB-03	ADA Paratransit Eligibility Certification Practices	TCRP Synthesis 30	1998
TCRP Synthesis J-07/Topic SB-11	Practices in Late Cancellation/No-Show Policies for ADA Paratransit	TCRP Synthesis 60	2004-2005
TCRP Synthesis J-07/Topic SB-24	Methods for Title VI Fare and Service Equity Analysis	Terminated	2009
TCRP Synthesis J-07/Topic SB-25	Practices for Establishing ADA Paratransit Assessment Facilities	TCRP Synthesis 116	2013-2015
TCRP Synthesis J-07/Topic SB-28	Administration of ADA Paratransit Eligibility Appeal Programs	Synthesis 133	2016
TCRP Synthesis J-07/Topic SB-32	Use of Agency Trip Agreements in ADA Paratransit Service Delivery	TCRP Research Results Digest 115	2018
TCRP Synthesis J-07/Topic SB-36	Dynamic Optimization on ADA Paratransit Service	TCRP Synthesis 168	2023

Project Number	Project Title	Status	Year(s)
TCRP Synthesis J-07/Topic SB-37	Transit Agency Goals and Non-Traditional Performance Indicators Focused on Equity	Active (Synthesis)	2022
TCRP Synthesis J-07/Topic SB-42	Operational and Service Factors When Integrating/Consolidating ADA Paratransit and Microtransit	New	2023
TCRP Synthesis J-07/Topic SG-14	ADA Paratransit Service Delivery Models	TCRP Synthesis 135	2016
TCRP Synthesis J-07/Topic SH-21	Transit Fare Capping: Balancing Revenue and Equity Impacts	TCRP Synthesis 160	2020

Source: Compiled in July 2023 using a keyword searches for equity, environmental justice, and ADA in the TRB project database (available online: <https://www.trb.org/Projects/FindaProject.aspx>).

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