



US DOT National
University Transportation Center for Safety

Carnegie Mellon University



#611 How and to what extent do Vision Zero plans address safety for different road user groups?

PI: Xiaoxia Dong (0000-0002-3907-3237)

Co-PI: Erick Guerra (0000-0002-7769-2581)

Co-PI: Megan Ryerson (0000-0002-8843-3286)

Final Report – August 31, 2026

DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. This document is disseminated in the interest of information exchange. The report is funded, partially or entirely, under [grant number 69A3552344811 / 69A3552348316] from the U.S. Department of Transportation's University Transportation Centers Program. The U.S. Government assumes no liability for the contents or use thereof.

Technical Report Documentation Page

1. Report No. #611	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Equity in Traffic Safety Planning: An Analysis of How Large U.S. Cities Address Equity in Vision Zero Plans		5. Report Date August 31, 2026
		6. Performing Organization Code
7. Author(s) Xiaoxia Dong, Ph.D. https://orcid.org/0000-0002-3907-3237		8. Performing Organization Report No.
9. Performing Organization Name and Address Department of City and Regional Planning Stuart Weitzman School of Design University of Pennsylvania 127 Meyerson Hall 210 S. 34th Street Philadelphia, PA 19104		10. Work Unit No.
		11. Contract or Grant No. Federal Grant # 69A3552344811 / 69A3552348316
12. Sponsoring Agency Name and Address U.S. Department of Transportation		13. Type of Report and Period Covered Final Report (July 1, 2025 – July 31, 2026)
		14. Sponsoring Agency Code USDOT
15. Supplementary Notes Conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration.		

16. Abstract

Traffic safety outcomes are not distributed equitably across geographies and population groups. Through a content analysis of vision zero plans in 62 large U.S. cities, this study examines how cities incorporate social and spatial equity into vision zero plans, identifies gaps in safety equity analysis and improvement strategies, and investigates the challenges for addressing traffic safety equity. Results suggest that most of the plans made no clear indication of how they incorporated feedback from disadvantaged communities into the plan-making process. Only one plan incorporated equity into the discussion of vehicle safety. There is an urgent need to incorporate equity into outcome evaluation metrics. Vision zero plans guide cities' safety improvement efforts. Ensuring equity is adequately addressed in vision zero plans is critical to making streets safer for all road users. Cities should consider (1). Integrating equity into outcome evaluation by establishing measurable safety improvement metrics for disadvantaged communities and expanding data collection beyond traffic crashes. (2). Incorporating equity into discussions of state-local coordination to enhance safety. (3). Considering assistance programs for vehicle maintenance and inspection in vision zero plans and as part of cities' larger effort to promote mobility equity.

17. Key Words

content analysis, equity, large U.S. cities, traffic safety, vision zero plan

18. Distribution Statement

No restrictions. This document is available through the National Technical Information Service, Springfield, VA 22161. Enter any other agency mandated distribution statements. Remove NTIS statement if it does not apply.

19. Security Classif. (of this report)

Unclassified.

20. Security Classif. (of this page)

Unclassified.

21. No. of Pages

31 pages.

22. Price

Planners have long regarded equity as one of the three pillars of planning (Campbell, 1996). In transportation, equity has been foregrounded as a goal for project investment and selection, infrastructure design, traffic enforcement, and program and service planning to name a few. The U.S. Department of Transportation considers improving the quality of life for all American people and communities as its core mission (U.S. Department of Transportation, 2020). However, transportation systems have been and still are profoundly inequitable (Brown, 2022; Bullard, 2003). The inequity is especially entrenched in traffic safety, defined as the ability of a person to travel freely without injury or death (Gelinne, 2017). Research has shown that Blacks, Hispanics, and people in lower-income areas experience worse road safety outcomes (Dumbaugh et al., 2022; Raifman & Choma, 2022; Roll & McNeil, 2022; Schneider et al., 2017).

Vision zero started in Sweden in the 1990s and aims to eliminate all traffic fatalities and severe injuries. Traditional traffic safety approach views traffic deaths and severe injuries as inevitable and emphasizes collision reduction through modifying human behavior. Vision zero departs from the traditional approach by recognizing that human error is inevitable and by promoting multidisciplinary approaches to lessen crash severity (Vision Zero Network, 2025). Since the mid-2010s, many large cities in the United States have adopted vision zero as an aspirational goal to guide their roadway safety improvement efforts to protect the most vulnerable road users. However, without regard to the various demographics of road users or the disparate socioeconomic conditions across locations, the allocation of safety improvement resources may exacerbate existing traffic safety disadvantage (Dumbaugh et al., 2024).

In recent years, as inequity in transportation becomes more recognized, cities have begun incorporating equity into their vision zero plans. However, there has been no systematic review of how cities address equity in their vision zero plans. Filling this research gap is critical for planners, policymakers, and academics to advance equity in traffic safety. For planners and policymakers, a panoramic evaluation of vision zero plans will help them identify what safety equity-related elements are missing from their own plans. An overview of vision zero plans will also allow cities to learn how peer cities address the challenges of improving safety equity. For academics, a thorough evaluation of vision zero plans will reveal common issues and research needs for enhancing traffic safety equity. Such understanding is crucial for scholars to work in synergy with practitioners to produce research that informs improvement strategies as cities continue to strive for transportation equity.

Through a content analysis of vision zero plans of 62 large U.S. cities, this study answers three research questions. First, how do cities incorporate equity into vision zero plans? Second, what are the gaps in the analysis and improvement strategies of traffic safety equity? Third, what are the challenges that cities face when addressing traffic safety equity? I find that most plans made no clear indication of how the plan incorporated feedback from disadvantaged communities into the plan-making process. Only one plan incorporated equity into the discussion of vehicle safety. There is an urgent need to incorporate equity into outcome evaluation metrics.

Traffic safety affects where and how people travel and therefore is closely tied to other aspects of planning such as land use. City governments have both direct and indirect control over measures that could enhance traffic safety. As the official document on traffic safety, vision zero plans lay out the blueprint for long-term traffic safety improvement while providing guidance for short-term implementation. Ensuring that equity is recognized and adequately addressed in vision zero plans represents a critical step towards making our streets safer for all road users. In the next section, I examine the existing literature on traffic safety equity. I explain the methodology, analysis framework, and limitations of the study in the Sample, methodology, and evaluation criteria section. I then present the main findings from the analysis in Evaluating vision zero plans, followed by a discussion of the lessons learned in the last section.

Equity in traffic safety

Transportation equity

Transportation is a basic right and a fundamental requirement to participate in the labor market, obtain health care, and access public services and recreational facilities (Bullard, 2003; Martens, 2016). While there is no single definition of equitable transportation (Brown, 2022), an equitable transportation system allows all communities to fully participate in these activities while distributing the benefits and costs of the transportation system in a fair manner (Litman, 2014). Disparate transportation outcomes occur when the benefits and burdens of transportation decisions are not distributed equitably across geographies and population groups (Bruzzone et al., 2023; Bullard, 2003; Madi et al., 2013), with disadvantaged populations often suffering more from the harmful impacts (Guo et al., 2020). Much like in other areas of planning, inequity in traffic safety is multidimensional and can manifest in various aspects (Brown, 2022). Bullard places transportation equity under three categories, procedural, geographic, and social (Bullard,

2003). Procedural equity concerns with the process of transportation decision-making (Bullard, 2003). Geographic equity focuses on the spatial distribution of the impacts of transportation decisions (Bullard, 2003). Social equity relates to the distribution of transportation benefits and burdens of transportation across population groups (Bullard, 2003). Because traffic safety determines whether road users could reach destinations without harm, equity in traffic safety underlies transportation equity.

Inequity in traffic safety

Researchers have studied inequity in traffic safety across races, ethnicities, and socioeconomic statuses. Dumbaugh et al. (2024) suggested that pedestrian crash risk reflects broader issues of racial and income inequality (Dumbaugh et al., 2024). Compared to affluent, White population, lower-income and minority populations are more likely to be injured or killed while walking (Q. Cai et al., 2017; Dumbaugh & Stiles, 2025; Guerra et al., 2019, 2020; Sanders & Schneider, 2022). Research has found that neighborhoods surrounding crash hotspots with high shares of wider, faster roads, and limited pedestrian crossing opportunities tend to have lower income and higher shares of minority populations (Schneider et al., 2021). Additionally, the crash risks posed by similar roadway facilities may be different across neighborhoods of different income levels. Dumbaugh et al. found that arterials pose greater crash risks in lower-income areas than in higher-income areas due to differences in trip purpose (Dumbaugh et al., 2022). Lower-income residents often have to take walk trips that are necessitated by employment or basic household tasks, even if the walking conditions might be unsafe (Dumbaugh et al., 2022). By contrast, affluent residents walk primarily for recreational purposes and can largely avoid unsafe walking conditions (Dumbaugh & Stiles, 2025).

In terms of behavior, studies have found that minority pedestrians experience discriminatory treatment by drivers when crossing the street (Goddard et al., 2015). In particular, drivers failed to yield to Black pedestrians when crossing the street than to white pedestrians (Coughenour et al., 2017; Goddard et al., 2015). Contrary to a common misperception, there is no conclusive evidence that alcohol use is responsible for the higher rates of pedestrian crashes observed in lower-income and minority neighborhoods or across minority racial groups (Dumbaugh et al., 2024; Sanders & Schneider, 2022).

Research has also attributed higher crash risk among lower-income population to poor vehicle conditions, as lower-income people are more likely to drive older vehicles that lack adequate safety features (Blumenberg & Haas, 2002; Girasek & Taylor, 2010).

In recent years, another traffic safety-related practice that has garnered attention due to its equity implications is speeding violation enforcement. Studies have found that racial and ethnic minorities are more likely to be pulled over for speeding violation than white drivers (Aggarwal et al., 2025; W. Cai et al., 2022). Researchers have also found racial bias in speed discounting, a practice when police officers give a break to speeding motorists by reporting a lower speed than their actual speed (Anbarci & Lee, 2014). A potential countermeasure to racial bias in speeding violation enforcement is automated speed enforcement such as speed cameras. Studies have shown that speed cameras reduce racial bias in speeding violation enforcement and reduce traffic crashes and fatalities (Guerra et al., 2024; Merlin et al., 2020; Quintanar, 2017; Retting & Farmer, 2003).

Plan and program evaluation

Several scholars have used content analysis for plan quality evaluation to determine whether the plans contain particular features of interest (Stevens et al., 2014). Such evaluations have allowed researchers to identify strengths, weaknesses, and overall quality of plans (Berke & Godschalk, 2009). Guerra (2016) reviewed long-range transportation plans to examine how large metropolitan planning organizations prepare for driverless cars and found that nearly all of the plans fail to discuss driverless cars due to uncertainties about the new technology and its relationship to short-term investment decisions (Guerra, 2016). Quattro and Daniels (2022) analyzed the comprehensive plans of 39 U.S. cities to examine whether the plans serve as a central guiding plan that is supported by a series of subplans on specific topics or geographic areas (Quattro & Daniels, 2022).

Some of the plan and program evaluation studies focus specifically on equity. Loh and Kim (2021) reviewed 48 comprehensive plans in Michigan to examine how and to what extent local municipalities incorporate goals and recommendations in comprehensive plans to achieve equitable outcomes (Loh & Kim, 2021). They evaluated the inclusion of equity in the comprehensive plans against a set of equity criteria and found that most plans do not discuss equity or include goals or recommendations that would advance equity (Loh & Kim, 2021).

Brown and Howell (2024) evaluated equity-oriented requirements for shared micromobility services such as e-scooter share and bikeshare in more than 200 programs in U.S. cities and found that most cities that enact equity-oriented policy requirements focus on expanding access rather than the outcomes of service usage (Brown & Howell, 2024). Lee et al. (2017) reviewed the level of commitment to equity in pedestrian and bicycle master plans from 13 major U.S. cities and found wide inconsistency in the extent to which equity is prioritized (Lee et al., 2017). Swanson (2026) conducted a content analysis to assess the equity orientation of climate actions plans for three municipalities in Ontario, Canada, and found “considerable risk that equity-deserving groups will be left behind in the transition to more climate-friendly communities” (Swanson, 2026, p. 271).

Equity in vision zero plans

By the time this study was conducted, nearly two-thirds of the top 100 most populous cities in the U.S. have adopted vision zero plans. However, if safety improvement measures were applied without regard to underlying social disparities and vulnerabilities, then they will unlikely produce meaningful safety benefits or mitigate existing safety disparities (Dumbaugh et al., 2024; Dumbaugh & Stiles, 2025). Vision zero plans are the guiding documents for cities’ traffic safety improvement efforts. A systematic review of how equity is incorporated into vision zero plans will help planners identify the strengths and weaknesses in their cities’ vision zero plans, understand what equity-related contents vision zero plans can include, and explore what planners can do to ensure equity is adequately addressed in future plan updates.

Sample, methodology, and evaluation criteria

Sample

As of early 2026, 62 of the 100 most populous cities in the U.S. had enacted vision zero plans. These plans form the sample of the current study. Since the initial vision zero plans, several cities have published plan updates, short-term action plans or progress reports. If the plan updates only focused on the progress the city had made and the planned future projects without explaining the plan-making process, methodology, mission, and guiding principles as extensively as did the original plans, then I reviewed the original plans. If the updated plan explained the plan-making process, analysis, and other core aspects of the vision zero plan, then I reviewed the updated plan instead of the original one. In two cases, the plan update provided additional

information on the original plan. I reviewed both plans in those cases. Table A in the Supplemental Material provides a full list of the vision zero plans that were included in the analysis.

Equity evaluation criteria

To systematically evaluate how vision zero plans incorporated and addressed equity in traffic safety, I chose eight evaluation criteria based on the transportation equity literature, current planning practice, and existing equity evaluation studies. I explain the evaluation criteria and sub-criteria here before discussing how they were measured in the Scoring protocol section.

Equity in plan goal, principle, and core value

Equity is one of the three pillars in planning (Campbell, 1996) and thus should be emphasized in vision zero plans as a main goal, principle, or core value. This criterion evaluates whether cities acknowledge equity as a guiding theme in their plans. For reference, a prior study by Loh and Kim (2021) examined how local comprehensive plans incorporate equity into their goals to advance equitable outcomes (Loh & Kim, 2021).

Equity in plan-making process

Procedural equity is one of the key elements in Bullard's transportation equity framework (Bullard, 2003). The American Planning Association advises that planning should involve the entire community (American Planning Association, n.d.; Morley, 2019). However, not all involvements in the planning process are equal. To distinguish the different levels of involvement, I defined three sub-criteria using Arnstein's Ladder of Citizen Participation, including non-participation, tokenism, and citizen power (Arnstein, 1969).

Equity in plan analysis

To address inequity in traffic safety, one must first recognize and understand it. A key component of vision zero plans is the analysis of issues that undermine safety in the transport system and the need for traffic safety improvement. This evaluation criterion examines whether the plan's traffic safety analysis included geographic and social equity in Bullard's transportation equity framework as explained in the Equity in Traffic Safety section (Bullard, 2003).

Equity in recommendations

Recommendations outline the actions that cities intend to take to achieve zero traffic fatality. Thus, evaluating equity in recommendations is critical as the recommendations may have direct and tangible impact on how safety benefits are distributed geographically and socially. In Loh and Kim's study, equity in plan recommendations was a key evaluation criterion (Loh & Kim, 2021). The Safe System Approach provides a comprehensive guiding framework for improving traffic safety (U.S. Department of Transportation, 2025). The framework includes five key objectives, including safer people, which encourages safe behavior by road users; safer roads, which advocates roadway designs that facilitate safe travel by vulnerable road users; safer speeds, which promotes safe speeds through a combination of roadway design and institutional strategies; safer vehicles, which promotes vehicle safety systems and features; and post-crash care, which enhances survivability of crashes through expedient access to emergency medical care and ensure safety of first responders (U.S. Department of Transportation, 2025).

I adopted the safer people, safer roads, safer speeds, and safer vehicles in the Safe System approach as the four criteria for evaluating equity in recommendations. Post-crash care focuses on expedient access to emergency medical care, creating a safe working environment for first responders, and preventing secondary crashes through robust traffic incident management practices (U.S. Department of Transportation, 2025). This objective has limited relevance to equity in crash prevention and mitigation and was therefore not considered an evaluation criterion in the current analysis.

Equity in outcome evaluation

Outcome evaluation often involves collecting and analyzing safety-related data after plan implementation to assess the effectiveness of the recommendations. I used geographic and social equity in Bullard's transportation equity framework to evaluate equity in safety outcome (Bullard, 2003).

While an equitable transportation system should ensure traffic safety for all vulnerable road users, in this study, I focused primarily on safety equity for racial minorities and low-income populations. Historically, racial minorities and low-income residents are disproportionately harmed by traffic crashes. Additionally, studies have shown that neighborhoods with higher percentages of non-white and/or low-income residents often have less

safe roadway infrastructure than whiter, wealthier neighborhoods (Dong et al., 2026; Guerra et al., 2019; Schneider et al., 2021). Focusing on racial minorities and low-income residents offers an opportunity to examine how vision zero plans address both social and spatial equity in traffic safety.

Scoring protocol

I developed a scoring system to evaluate how vision zero plans address equity under each evaluation criterion. As shown in Table 1, for plan theme, plan-making process, and outcome evaluation, there are three ordinal scores (0, 1, 2) indicating to what extent the plan addresses equity under each of the three criteria. Swanson (2026) used a similar 3-score point rubric in her review of climate action plans (Swanson, 2026). For plan analysis and recommendations, I used binary scores (0, 1) to indicate whether a plan considers equity under each criterion.

Table 1. Scoring protocol for evaluating how and to what extent vision zero plans address equity under each evaluation criterion

Evaluation criteria	Scoring metrics
	<i>How does the plan discuss equity in its goal, principle, and core value?</i>
<i>Plan theme</i>	• 0 = No mention of equity • 1 = Mentions equity generally but not explicitly (e.g., the plan aims to improve safety for all users in all neighborhoods) • 2 = Discusses equity explicitly
	<i>How does the plan-making process ensure equity?</i>
<i>Plan-making</i>	• 0 = No mention of equity or non-participatory (i.e., non-participation) • 1 = Informs or consults with disadvantaged residents but no assurance that their feedback will be incorporated into plan-making (i.e., tokenism) • 2 = Explicitly indicates that feedback from disadvantaged residents will be incorporated into plan-making through partnership(i.e., citizen power)
	<i>Does the plan analysis consider social and geographical equity?</i>
<i>Plan Analysis</i>	• 0 = No mention of social or geographical equity in plan analysis, or only refers to equity generally • 1 = Explicitly incorporates social and/or geographical equity into plan analysis
	<i>Does the recommendation address social and geographical equity?</i>
<i>Recommendations</i>	• 0 = Mentions social or geographical equity generally or no mention of social or geographical equity at all • 1 = Explicitly incorporates social and/or geographical equity into recommendations
	<i>Are there specific evaluation metrics for equity?</i>
<i>Outcome evaluation</i>	• 0 = No evaluation of recommendations aimed at improving equity • 1 = Mentions equity in evaluation metrics but no specific, quantifiable measures • 2 = Has measurable evaluation metrics for equity

To ensure the reliability and replicability of the evaluations, I followed the content analysis for plan evaluation procedures explained by Stevens et al., who recommended employing two or more researchers to independently evaluate the plan, and then comparing the evaluations made by the researchers (Stevens et al., 2014). In the current study, the scoring was completed by two

research assistants, both of whom were master's students in an accredited city planning program in the United States. I trained the two research assistants to evaluate plans based on the scoring protocol shown in Table 1. To ensure consistency of scoring, the two research assistants and I evaluated the first ten plans independently and discussed the sources of any discrepancies in our scores. Based on our discussion, we clarified the scoring protocol accordingly. The two research assistants then worked independently to evaluate the other 52 plans. I met weekly with the research assistants to discuss and resolve any differences in their scores. The summary of scores reported in the next section reflects the consensus between the two research assistants after the weekly discussions.

For each evaluation criterion, I calculated Krippendorff's alpha for the scores that each research assistant assigned independently across the 62 vision zero plans before the weekly discussions for consensus (Krippendorff, 2004). Krippendorff's alpha assesses intercoder reliability, or the degree to which the two research assistants concur with the scores that they independently assign (Krippendorff, 2004). Krippendorff's alpha ranges between 0 and 1, with a score closer to 1 indicating higher level of agreement between the two research assistants on their independent scores. For all evaluation criteria, the Krippendorff's alphas were greater than 0.9 across the across vision zero plans in the sample. This result shows that even before the weekly discussions, the two research assistants had a very high degree of agreement in their scores. This agreement suggests that in general, there was little ambiguity in how the plans approach equity under each criterion. Krippendorff's alphas were calculated using the online K-Alpha Calculator (Marzi et al., 2024).

Limitations

Due to the different local contexts, extents of project implementation, plan horizons, and evaluation metrics for project effectiveness, this analysis focused on the plan contents and not the outcomes. As such, the summary of practice presented in the next section is not meant to be viewed as best practice, but as references for future vision zero plan updates. Relatedly, lacking discussion of equity in the vision zero plan under certain evaluation criteria might not necessarily indicate that the city failed to address equity in those criteria in practice. This study focused primarily on traffic safety equity for racial minorities and low-income residents. Future research should explore how vision zero plans address safety for other vulnerable road users such as

people with disabilities, youths, and residents with no car access.

Evaluating vision zero plans

In this section, I summarize the main findings from the content analysis for each of the plan evaluation criteria. Table 2 shows the score distribution across plans by evaluation criterion and a summary of equity-related contents under each criterion. Through this analysis, I aim to illustrate what equity-related contents cities have incorporated into their vision zero plans, how, and to what extent.

Table 2. Distribution of scores and summary of equity-related discussion by plan evaluation criterion

Evaluation criteria	Score distribution (%)			Summary of equity-related discussion
	0	1	2	
<i>Plan theme</i>	9.7	6.5	83.9	• Equity guides the principles of the plan • Integrating equity into actions defined within the plan • Strategies and investments must prioritize vulnerable communities that are most disproportionately affected by traffic deaths and serious injuries
<i>Plan-making</i>	43.5	41.9	14.5	• Representation from vulnerable communities in planning task force • Promoting collaboration with vulnerable communities • Inclusive plan outreach and engagement (e.g., multiple languages, multiple outreach efforts and methods, multiple platforms) for meaningful input from vulnerable communities • Sharing project information across platforms • Ensuring community feedback informs recommendations, plan analysis, and project prioritization
<i>Analysis</i>	12.9	87.1	N.A.	• Data-driven approach with multiple vulnerability indicators to identify disadvantaged communities • Overlaying disadvantaged communities with high crash areas • Traffic death rates breakdown by demographics
<i>Recommendations: Safer People</i>	35.5	64.5	N.A.	• Safety programs and public education campaign targeting vulnerable communities and populations • Multilingual messaging , multiple communication methods for public safety outreach • Ensuring representation from vulnerable communities in education campaign
<i>Recommendations: Safer Streets</i>	24.2	75.8	N.A.	• Prioritizing safe street projects and investments within disadvantaged neighborhoods

<i>Recommendations: Safer Speeds</i>	45.2	54.8	N.A.	• Prioritizing speed reduction in vulnerable communities through street design, safety feature deployment, and regulatory measures • Promoting equitable speed enforcement in disadvantaged neighborhoods
<i>Recommendations: Safer Vehicles</i>	96.8	3.2	N.A.	• Taillight clinics and other programs to ensure low-income residents can operate safe vehicles • Exploring safe and affordable alternatives to personal vehicle ownership • Ensuring future autonomous vehicle deployment enhances safety for all road users
<i>Outcome evaluation</i>	35.5	17.7	46.8	• Including community partners in evaluation of safety countermeasures • Conducting equity impact assessments for proposed safety projects in disadvantaged neighborhoods • Tracking and publishing traffic death and injury data by demographics and in disadvantaged communities • Tracking number and share of safety investments and projects in disadvantaged communities

Plan theme

Most vision zero plans recognized equity as a key element in their plan themes. Roughly 84% of the 62 plans that I examined explicitly mentioned equity in their goal, principle, and core value. For comparison, in the study of local comprehensive plans in Michigan, less than half mentioned equity (Loh & Kim, 2021). Only ten of the 62 vision zero plans either implied equity generally (e.g., this plan “aims to protect everyone.”) or failed to mention equity altogether in their plan themes. Among the plans that mentioned equity explicitly, some provided more specifics on what equity means and for whom. For example, in San Francisco’s vision zero plan, one of the core principles was to prioritize traffic safety investments in neighborhoods and communities that are most disproportionately impacted by traffic deaths and severe injuries (Vision Zero SF, 2021). By contrast, some plans incorporated equity into their plan themes more broadly. For example, one plan’s core principle stated that vision zero actions will take a comprehensive, collaborative, and equitable approach through engineering, education and culture change, and traffic enforcement. Incorporating equity into plan themes and guiding principles gives clear

indication of the plan's commitment to equity, even though omitting equity in plan themes might not necessarily mean that the plan failed to address equity.

Plan-making

Equity received very uneven coverage in the description of plan-making process across vision zero plans. Approximately 44% of the plans failed to mention whether and how the plan-making process ensured meaningful participation for disadvantaged populations or neighborhoods of concern. Roughly 42% of the plans described participation of disadvantaged populations through outreach programs and community meetings without explaining how feedback from residents was used to inform plan analysis or recommendations. Only nine plans discussed how resident participation will impact plan contents. The vision zero plan for Madison, WI, for example, stated that feedback from the city's outreach efforts must be incorporated into the strategies and actions that the plan recommends (City of Madison, 2020).

As is the case with plan theme, the lack of description of equity in the plan-making process does not necessarily indicate that the planning process ignored disadvantaged populations and communities. Nor does it suggest that feedback from communities of concern was not properly accounted for in the plan contents. However, clear documentation of whether and how resident participation informed the plan signals the city's willingness to work with and empower disadvantaged populations and communities.

Plan analysis

Nearly 90% of the plans incorporated social and spatial equity into their safety analysis. A common approach for examining the disparity in crash risks overlays disadvantaged areas with the frequency of severe traffic crashes. For example, San Francisco's vision zero plan recognized geographic inequities using evidence that the city's high injury network, the 13% of streets where 75% of severe and fatal crashes occur, is disproportionately concentrated in low-income communities and communities of color (Vision Zero SF, 2021). Chicago's vision zero plan reported that among the city's eight High Crash Areas, seven overlap with communities of High Economic Hardship (City of Chicago, 2017).

When identifying disadvantaged areas, cities often created certain scoring systems that combine socioeconomic and demographic indicators that are associated with social vulnerability.

Common indicators include poverty status, zero-car households, race and ethnicity, English proficiency, age, and people with disabilities. Some cities also incorporated unemployment, educational attainment, and crowded housing into their scoring systems. While most cities in the sample conducted their own analysis to identify vulnerable population and disadvantaged communities, a few cities identified communities of concern using indices developed by federal agencies. For example, Arlington, Texas (City of Arlington, 2024), identified disadvantaged communities using the U.S. DOT Equitable Transportation Community Explorer, which combines indicators associated with disadvantage to define vulnerable Census tracts (U.S. Department of Transportation, 2023). Fort Worth, Texas (City of Fort Worth, 2025), identified high needs areas using the Social Vulnerability Index developed by the Centers for Disease Control and Prevention (CDC, 2024).

Recommendations

About two-thirds of the cities in the sample explicitly incorporated equity into their Safer People initiatives, primarily through safety education campaigns targeted at disadvantaged communities. In addition to the disadvantaged communities identified in the plan analysis, several cities also highlighted the need to reach out to immigrants, the homeless, and people in treatment, as well as the need to use multilingual materials to ensure the safety messages reach residents with limited English proficiency. While cities intended for their education campaigns to change residents' attitudes toward traffic crashes and help improve safety behavior, only a few offered details on what the campaigns would entail. One such example is Fort Worth, Texas. The city recommended key tactics to support its comprehensive multimedia public communications safety campaign, such as telling stories of “the personal and social impacts of traffic violence, neighborhood and project success stories, and messaging from trusted community leaders” (City of Fort Worth, 2025, p. 27).

Over 75% of the cities incorporated equity into their Safer Streets initiatives. Nearly all those cities recommended actions to achieve equity in safety infrastructure through project prioritization for high-injury streets that are located in disadvantaged communities. Minneapolis was the only city that explicitly discussed equitable prioritization of safety investments on non-high injury streets (City of Minneapolis, 2019). In addition to prioritization of safety projects and

investments in disadvantaged areas, most plans also aimed to further safety equity for vulnerable road users such as people with disabilities, youths, and the elderly.

Roughly 55% of the cities in the sample incorporated equity into the discussion of Safer Speeds. Strategies to enhance safety equity under Safer Speeds typically fall into two broad categories. The first category focuses on prioritizing physical measures (e.g., speed humps) and roadway redesign (e.g., travel lane reduction) in disadvantaged communities to reduce speeds. The second category emphasizes regulatory measures in disadvantaged communities, such as speed limit reduction. Many cities also proposed automated speed cameras to ensure speed enforcement is, as San Diego's vision zero plan explained, color blind, ethnicity blind, and income blind (City of San Diego, 2020), and does not exacerbate existing inequities through interactions with law enforcement and racial profiling (Vision Zero SF, 2021).

Due to the separate jurisdictions between cities and states (and sometimes counties) over roadways, many vision zero plans explained that implementing recommendations for Safer Streets and Safer Speeds on state-owned roads would require state approval, even though these roads might be located within city boundaries.

Discussion of equity in Safer Vehicles was lacking among the vision zero plans examined. In fact, only Detroit's vision zero plan incorporated equity into its Safer Vehicles discussion (City of Detroit, 2022). The plan proposed pilot taillight clinics and other programs to ensure residents of all income levels can operate safe vehicles, though it did not mention what the other programs might entail. The other vision zero plans primarily focused on improving vehicle safety through installing safety features on city fleet, exploring autonomous technology, and conducting safety training for city employees who operate vehicles without clear references to safety equity.

Outcome evaluation

Roughly half of the vision zero plans in the sample proposed metrics to evaluate the effectiveness of the recommended actions at advancing safety equity. The other half either mentioned equity without specific, quantifiable measures (17.7%), or had no evaluation of the actions aimed at improving equity at all (35.5%). Common metrics included the number of crashes, the level of safety improvement investments, and the number of safety projects implemented in disadvantaged communities. A few cities also proposed to break down the

number of traffic fatalities and severe injuries by demographics such as race and ethnicity. San Francisco, for example, proposed to issue an annual research brief to address traffic injury inequities related to homelessness, race and ethnicity, language, income, and immigration status to inform future policies and projects (Vision Zero SF, 2021). Several cities also developed measures to evaluate safety equity beyond crash outcomes. For example, Toledo, Ohio, recommended tracking “the number and percent of Vision Zero Coordinating Committee members that have a lived understanding of equity related to race, age, disability, and socioeconomics” (City of Toledo, 2023, p. 51). Atlanta, Georgia, recommended assessing and publishing “metrics on automated speed camera enforcement to ensure enforcement does not cause additional harm to marginalized communities” (City of Atlanta, 2023, p. 62).

Recommendations for future traffic safety plans

Vision zero plans are the blueprint for cities’ short-term and long-term traffic safety improvement efforts. Adequately addressing spatial and social equity in both the plan-making process and the plan contents is a critical step to ensuring the safety benefits do not exclude disadvantaged populations, who have been harmed disproportionately by traffic crashes. Over the past two decades, planners have accumulated considerable institutional knowledge of strategies that enhance traffic safety. However, there remains opportunities to further translate that knowledge into greater traffic safety equity. Drawing on lessons from the content analysis, I make three recommendations to further equity in traffic safety through local traffic safety plans.

Incorporating equity into outcome evaluation

The purpose of outcome evaluation in vision zero plans is to examine whether the proposed safety measures have achieved the intended goals. Such evaluation often involves comparison of total, often city-wide traffic crash counts and fatalities before and after project and program implementation. While aggregate crash counts can show a city’s overall safety trend over time, they offer limited information on the safety wellbeing of disadvantaged communities and may obscure the spatial disparity in safety across neighborhoods within the city. To make visible a safety issue facing disadvantaged communities and population groups, cities need to publish crash statistics for disadvantaged neighborhoods and vulnerable population groups, in addition to aggregate, city-wide crash counts. For cities that have already identified disadvantaged neighborhoods in their vision zero plans, incorporating equity into outcome evaluation may

simply require tallying crash counts in those neighborhoods and comparing the counts over time and with the city-wide aggregate.

In order to enable meaningful evaluations that incorporate equity, two actions are needed when creating vision zero plans. First, cities must establish measurable safety improvement metrics for disadvantaged neighborhoods and population groups. Measurable metrics allow planners, officials, and the public to evaluate which safety improvement measure fell short and by how much. This knowledge will in turn enable cities to adjust strategies to ensure traditionally underserved neighborhoods and vulnerable populations are not disproportionately excluded from safety benefits.

The second action is to expand data collection beyond traffic crashes. Traffic crash data show when, where, and how crashes occurred, and have allowed practitioners and researchers to develop valuable insights into the contributing factors of crashes and design evidence-based strategies to mitigate those factors. To further equity in traffic safety, cities may consider collecting other types of data to monitor progress and establish performance metrics. For example, cities such as Atlanta proposed to track the percentage of street safety improvements in disadvantaged communities (City of Atlanta, 2023), while cities like Long Beach, California, plan to monitor annual safety investments by socio-demographics to ensure equitable impacts on disadvantaged communities (City of Long Beach, 2020). Other equity-related safety metrics that are proposed by the reviewed vision zero plans include the race and ethnicity of those involved in crashes, traffic citations by socio-demographics, and number of grants funded that addresses equity-related safety issues, among others. Given the recency of most of these proposed performance metrics, cities should periodically assess how effective they are at evaluating the distribution of safety benefits to inform future plan updates.

Incorporating equity into state and local coordination

An issue that could have safety equity implications is the separate jurisdictions between cities and states over roadways. Unlike land use planning, local municipalities have less control over their transportation system. On certain roads, street design and traffic regulations, such as lane configuration, placement of parking, and speed limits, must be made with approval from state department of transportation, even though these roads might be within the city's boundaries and perceived by residents as local roads. Studies have found that wide, fast, major urban arterials

can pose disproportionate safety risks to residents in disadvantaged neighborhoods (Dong et al., 2026; Guerra et al., 2019; Schneider et al., 2021). In some cities, major urban arterials are owned by the state rather than the municipality. Safety improvements on these roads, such as speed reduction and road diet, would need state approval, which requires coordination between local municipalities and their states' departments of transportation. Strengthening state-local cooperation to enable the implementation of these safety measures thus could be critical to ensuring safety equity.

In addition to roadway design and speed regulation, states also have authority over the use of automated enforcement such as speed cameras. The content analysis shows that several plans advocated for the use of automated enforcement to avoid racial profiling and increase safety enforcement in an unbiased manner. However, many states, such as California, Pennsylvania, and Texas, ban automated enforcement technology, effectively making it illegal for local municipalities to deploy such technology without state approval. Legalizing such technology or streamlining the approval process could help remove roadblocks for cities to utilize proven tools such as speed cameras to improve safety and enhance safety equity (Guerra et al., 2024; Merlin et al., 2020; Quintanar, 2017; Retting & Farmer, 2003).

While several vision zero plans recognized the importance of state-local cooperation for achieving safety goals, few incorporated equity into the discussion. Even though state authority over roadway design and traffic operations could sometimes appear to be at odds with local efforts to enhance safety, state and local goals to reduce traffic fatalities are nonetheless aligned—many states have adopted zero fatality goals in their strategic highway safety plans. As cities continue to update their vision zero plans, safety equity could serve as an additional motivation for greater cooperation between state and local jurisdictions to advance their mutual safety goals for all road users.

Considering safer vehicles in proposed strategies

The content analysis revealed that only Detroit's vision zero plan incorporated equity discussion into its recommendations under the Safer Vehicles objective. In many parts of the U.S., automobility is critical for accessing essential services, employment, and educational opportunities. However, vehicle operating costs are high and volatile (King et al., 2022). Research has shown that low-income people are more likely to drive older, less reliable vehicles

that lack contemporary safety features, which may contribute to their higher crash risks (Dumbaugh et al., 2022; Girasek & Taylor, 2010; Harper et al., 2015). Providing resources for low-income households for necessary vehicle upgrade and maintenance means that people may not have to sacrifice safety to afford mobility.

To improve mobility for low-income residents, several jurisdictions offer discount rides, transit passes, taxi coupons, and other subsidy programs. In recent years, some scholars have even advocated universal access to vehicles for those who cannot afford automobility (King et al., 2022). Traffic safety is a critical component of mobility. Cities should consider incorporating assistance programs for vehicle maintenance and inspection into their vision zero plans and as part of their larger effort to promote mobility equity. Such strategies would align well with cities' zero fatality vision, as they help to enhance safe mobility not only for the programs' direct recipients but also for other people with whom they share the road.

Conclusion

As the official document on traffic safety, vision zero plans guide cities' safety improvement efforts. Adequately addressing equity in vision zero plans is critical for ensuring the benefits and burdens of transportation decisions are distributed equitably across geographies and population groups. In this study, I examined how vision zero plans in 62 large U.S. cities incorporated equity into their plan theme, plan-making process, analysis, recommendations, and outcome evaluations. I found that most plans incorporated equity into their goals, core values, and principles. However, there is a need to provide clear indication of how the plan utilized feedback from disadvantaged communities, to incorporate discussion of equity into state-local coordination and recommendations of vehicle safety, and to include equity in project outcome evaluation metrics.

Disclosure statement

The author has no conflict of interest to declare for this study.

Funding support

This research was supported by Safety21 University Transportation Center (USDOT Award No. 69A3552344811 and No. 69A3552348316).

References

- Aggarwal, P., Brandon, A., Goldszmidt, A., Holz, J., List, J. A., Muir, I., Sun, G., & Yu, T. (2025). High-frequency location data show that race affects citations and fines for speeding. *Science*, 387(6741), 1397–1401. <https://doi.org/10.1126/science.adp5357>
- American Planning Association. (n.d.). *What Is Planning?* American Planning Association. Retrieved February 7, 2026, from <https://www.planning.org/educators/whatisplanning/>
- Anbarci, N., & Lee, J. (2014). Detecting racial bias in speed discounting: Evidence from speeding tickets in Boston. *International Review of Law and Economics*, 38, 11–24. <https://doi.org/10.1016/j.irle.2014.02.002>
- Arnstein, S. R. (1969). A Ladder Of Citizen Participation. *Journal of the American Institute of Planners*, 35(4), 216–224. <https://doi.org/10.1080/01944366908977225>
- Berke, P., & Godschalk, D. (2009). Searching for the Good Plan: A Meta-Analysis of Plan Quality Studies. *Journal of Planning Literature*, 23(3), 227–240. <https://doi.org/10.1177/0885412208327014>
- Blumenberg, E., & Haas, P. (2002). The Travel Behavior and Needs of the Poor: A Study of Welfare Recipients in Fresno County, California, MTI Report 01-23. *Mineta Transportation Institute*. https://scholarworks.sjsu.edu/mti_publications/180
- Brown, A. (2022). From aspiration to operation: Ensuring equity in transportation. *Transport Reviews*, 42(4), 409–414. <https://doi.org/10.1080/01441647.2022.2064527>
- Brown, A., & Howell, A. (2024). Mobility for the people: Equity requirements in US shared micromobility programs. *Journal of Cycling and Micromobility Research*, 2, 100020. <https://doi.org/10.1016/j.jcmr.2024.100020>
- Bruzzzone, F., Cavallaro, F., & Nocera, S. (2023). The definition of equity in transport. *Transportation Research Procedia, AIIIT 3rd International Conference on Transport Infrastructure and Systems (TIS ROMA 2022), 15th-16th September 2022, Rome, Italy*, 69, 440–447. <https://doi.org/10.1016/j.trpro.2023.02.193>
- Bullard, R. (2003). Addressing Urban Transportation Equity in the United States. *Fordham Urban Law Journal*, 31(5), 1183.

- Cai, Q., Abdel-Aty, M., Lee, J., & Eluru, N. (2017). Comparative analysis of zonal systems for macro-level crash modeling. *Journal of Safety Research*, 61, 157–166.
<https://doi.org/10.1016/j.jsr.2017.02.018>
- Cai, W., Gaebler, J., Kaashoek, J., Pinals, L., Madden, S., & Goel, S. (2022). Measuring racial and ethnic disparities in traffic enforcement with large-scale telematics data. *PNAS Nexus*, 1(4), pgac144. <https://doi.org/10.1093/pnasnexus/pgac144>
- Campbell, S. D. (1996). Green Cities, Growing Cities, Just Cities?: Urban Planning and the Contradictions of Sustainable Development. *Journal of the American Planning Association*, 62(3), 296–312. <https://doi.org/10.1080/01944369608975696>
- CDC. (2024). *Social Vulnerability Index*. Place and Health - Geospatial Research, Analysis, and Services Program (GRASP). <https://www.atsdr.cdc.gov/place-health/php/svi/index.html>
- City of Arlington. (2024). *Safe Streets Arlington: Comprehensive Safety Action Plan*.
<https://viewer.joomag.com/safe-streets-arlington-plan-safe-streets-arlington-plan/0191076001731968927?short&>
- City of Atlanta. (2023). *Vision Zero Action Plan*.
<https://www.atlantaga.gov/home/showdocument?id=61823&t=638463700508218706>
- City of Chicago. (2017). *Vision Zero Chicago Action Plan 2017-2019*.
<https://api.chicago.gov/filenet5/servlets/getDocumentContent?applicationId=CompleteStreets&documentId=%7B0031C690-0000-C016-92E9-31618D7320B1%7D>
- City of Detroit. (2022). *Streets for People: Detroit Comprehensive Safety Action Plan*.
<https://detroitmi.gov/sites/detroitmi.localhost/files/2022-09/Detroit%20CSAP.pdf>
- City of Fort Worth. (2025). *Fort Worth Vision Zero Safety Action Plan*.
<https://www.fortworthtexas.gov/files/assets/public/v/1/vision-zero-safety-plan-action-plan.pdf>
- City of Long Beach. (2020). *Safe Streets Long Beach: A Vision Zero Action Plan*.
- City of Madison. (2020). *Vision Zero Madison Action Plan 2020-2035*.
https://www.cityofmadison.com/transportation/documents/vision-zero/Action%20Plan_FINAL.pdf

- City of Minneapolis. (2019). *Minneapolis Vision Zero Action Plan 2020-2022*.
<https://www.minneapolismn.gov/media/-www-content-assets/documents/VZ-Action-Plan-2020-22.pdf>
- City of San Diego. (2020). *Vision Zero Strategic Plan 2020-2025*.
<https://www.sandiego.gov/sites/default/files/vision-zero-strategic-plan-2020-2025.pdf>
- City of Toledo. (2023). *Toledo Vision Zero 2023*.
<https://cdn.toledo.oh.gov/uploads/documents/Public-Service/Transportation/2023-Toledo-Vision-Zero-Plan-Draft.pdf>
- Coughenour, C., Clark, S., Singh, A., Claw, E., Abelar, J., & Huebner, J. (2017). Examining racial bias as a potential factor in pedestrian crashes. *Accident Analysis & Prevention*, 98, 96–100. <https://doi.org/10.1016/j.aap.2016.09.031>
- Dong, X., Guerra, E., & Wu, J. S. (2026). How have the associations between crash risks and roadway, speed, and the built environment changed after COVID-19? *Journal of Safety Research*, 97, 29–39. <https://doi.org/10.1016/j.jsr.2026.01.016>
- Dumbaugh, E., Li, Y., Saha, D., & Marshall, W. (2022). Why do lower-income areas experience worse road safety outcomes? Examining the role of the built environment in Orange County, Florida. *Transportation Research Interdisciplinary Perspectives*, 16, 100696. <https://doi.org/10.1016/j.trip.2022.100696>
- Dumbaugh, E., & Stiles, J. (2025). Social vulnerability: A review of the literature on pedestrian crash risk in lower-income and minority communities. *Journal of Transport and Land Use*, 18(1), 221–235. <https://doi.org/10.5198/jtlu.2025.2547>
- Dumbaugh, E., Stiles, J., Mitsova, D., & Saha, D. (2024). The Most Vulnerable User: Examining the Role of Income, Race, and the Built Environment on Pedestrian Injuries and Deaths. *Transportation Research Record*, 2678(2), 743–752. <https://doi.org/10.1177/03611981231175888>
- Gelline, D. (2017). *Road Safety Fundamentals- UNIT 1: Foundations of Road Safety* (FHWA-SA-18-003). Federal Highway Administration. <https://highways.dot.gov/safety/learn-safety/road-safety-fundamentals-html-version/unit-1-foundations-road-safety>

- Girasek, D. C., & Taylor, B. (2010). An Exploratory Study of the Relationship Between Socioeconomic Status and Motor Vehicle Safety Features. *Traffic Injury Prevention, 11*(2), 151–155. <https://doi.org/10.1080/15389580903531598>
- Goddard, T., Kahn, K. B., & Adkins, A. (2015). Racial bias in driver yielding behavior at crosswalks. *Transportation Research Part F: Traffic Psychology and Behaviour, 33*, 1–6. <https://doi.org/10.1016/j.trf.2015.06.002>
- Guerra, E. (2016). Planning for Cars That Drive Themselves: Metropolitan Planning Organizations, Regional Transportation Plans, and Autonomous Vehicles. *Journal of Planning Education and Research, 36*(2), 210–224. <https://doi.org/10.1177/0739456X15613591>
- Guerra, E., Dong, X., & Kondo, M. (2019). Do Denser Neighborhoods Have Safer Streets? Population Density and Traffic Safety in the Philadelphia Region. *Journal of Planning Education and Research, 0739456X19845043*. <https://doi.org/10.1177/0739456X19845043>
- Guerra, E., Dong, X., Lin, L., & Guo, Y. (2020). Temporal Analysis of Predictors of Pedestrian Crashes. *Transportation Research Record, 2674*(8), 252–263. <https://doi.org/10.1177/0361198120920633>
- Guerra, E., Puchalsky, C., Kovalova, N., Hu, Y., Si, Q., Tan, J., & Zhao, G. (2024). Evaluating the Effectiveness of Speed Cameras on Philadelphia's Roosevelt Boulevard. *Transportation Research Record, 03611981241230320*. <https://doi.org/10.1177/03611981241230320>
- Guo, Y., Chen, Z., Stuart, A., Li, X., & Zhang, Y. (2020). A systematic overview of transportation equity in terms of accessibility, traffic emissions, and safety outcomes: From conventional to emerging technologies. *Transportation Research Interdisciplinary Perspectives, 4*, 100091. <https://doi.org/10.1016/j.trip.2020.100091>
- Harper, S., Charters, T. J., & Strumpf, E. C. (2015). Trends in Socioeconomic Inequalities in Motor Vehicle Accident Deaths in the United States, 1995–2010. *American Journal of Epidemiology, 182*(7), 606–614. <https://doi.org/10.1093/aje/kwv099>

- King, D. A., Smart, M. J., & Manville, M. (2022). The Poverty of the Carless: Toward Universal Auto Access. *Journal of Planning Education and Research*, 42(3), 464–481.
<https://doi.org/10.1177/0739456X18823252>
- Krippendorff, K. (2004). *Content analysis: An introduction to its methodology* (Second edition.). Sage.
- Lee, R. J., Sener, I. N., & Jones, S. N. (2017). Understanding the role of equity in active transportation planning in the United States. *Transport Reviews*, 37(2), 211–226.
<https://doi.org/10.1080/01441647.2016.1239660>
- Litman, T. (2014). *Evaluating Transportation Equity: Guidance For Incorporating Distributional Impacts in Transportation Planning*. Victoria Transport Policy Institute.
https://nacto.org/wp-content/uploads/2014_Litman_Evaluating-Transportation-Equity.pdf
- Loh, C. G., & Kim, R. (2021). Are We Planning for Equity?: Equity Goals and Recommendations in Local Comprehensive Plans. *Journal of the American Planning Association*, 87(2), 181–196. <https://doi.org/10.1080/01944363.2020.1829498>
- Madi, M., Wiegmann, J., Parkany, E., Swisher, M., & Symoun, J. (2013). *Guidebook for State, Regional, and Local Governments on Addressing Potential Equity Impacts of Road Pricing* (FHWA-HOP-13-033). Federal Highway Administration.
<https://rosap.nhtl.bts.gov/view/dot/42203>
- Martens, K. (2016). *Transport Justice: Designing fair transportation systems*. Routledge.
<https://doi.org/10.4324/9781315746852>
- Marzi, G., Balzano, M., & Marchiori, D. (2024). K-Alpha Calculator–Krippendorff’s Alpha Calculator: A user-friendly tool for computing Krippendorff’s Alpha inter-rater reliability coefficient. *MethodsX*, 12, 102545. <https://doi.org/10.1016/j.mex.2023.102545>
- Merlin, L. A., Guerra, E., & Dumbaugh, E. (2020). Crash risk, crash exposure, and the built environment: A conceptual review. *Accident Analysis & Prevention*, 134, 105244.
<https://doi.org/10.1016/j.aap.2019.07.020>
- Morley, D. (2019). *PAS QuickNotes: Inclusive Planning Processes* (No. 82). American Planning Association. <https://planning.org/publications/document/9186035/>

- Quattro, C., & Daniels, T. (2022). The Constellation of Plans: Toward a New Structure of Comprehensive Plans in US Cities. *Land, 11*(10). <https://doi.org/10.3390/land11101767>
- Quintanar, S. M. (2017). MAN VS. MACHINE: AN INVESTIGATION OF SPEEDING TICKET DISPARITIES BASED ON GENDER AND RACE. *Journal of Applied Economics, 20*(1), 1–28. (123376110). [https://doi.org/10.1016/S1514-0326\(17\)30001-6](https://doi.org/10.1016/S1514-0326(17)30001-6)
- Raifman, M. A., & Choma, E. F. (2022). Disparities in Activity and Traffic Fatalities by Race/Ethnicity. *American Journal of Preventive Medicine, 63*(2), 160–167. <https://doi.org/10.1016/j.amepre.2022.03.012>
- Retting, R. A., & Farmer, C. M. (2003). Evaluation of Speed Camera Enforcement in the District of Columbia. *Transportation Research Record, 1830*(1), 34–37. <https://doi.org/10.3141/1830-05>
- Roll, J., & McNeil, N. (2022). Race and income disparities in pedestrian injuries: Factors influencing pedestrian safety inequity. *Transportation Research Part D: Transport and Environment, 107*, 103294. <https://doi.org/10.1016/j.trd.2022.103294>
- Sanders, R. L., & Schneider, R. J. (2022). An exploration of pedestrian fatalities by race in the United States. *Transportation Research Part D: Transport and Environment, 107*, 103298. <https://doi.org/10.1016/j.trd.2022.103298>
- Schneider, R. J., Sanders, R., Proulx, F., & Moayyed, H. (2021). United States fatal pedestrian crash hot spot locations and characteristics. *Journal of Transport and Land Use, 14*(1), 1–23. <https://doi.org/10.5198/jtlu.2021.1825>
- Schneider, R. J., Vargo, J., & Sanatizadeh, A. (2017). Comparison of US metropolitan region pedestrian and bicyclist fatality rates. *Accident Analysis & Prevention, 106*, 82–98. <https://doi.org/10.1016/j.aap.2017.04.018>
- Stevens, M. R., Lyles, W., & Berke, P. R. (2014). Measuring and Reporting Inter-coder Reliability in Plan Quality Evaluation Research. *Journal of Planning Education and Research, 34*(1), 77–93. <https://doi.org/10.1177/0739456X13513614>
- Swanson, K. (2026). “The Big Ship Turns Around Slowly”: An Evaluation of Equity and Justice in Ontario Climate Action Plans. *Journal of the American Planning Association, 92*(2), 259–274. <https://doi.org/10.1080/01944363.2025.2587042>

U.S. Department of Transportation. (2020, May 6). *U.S. Department of Transportation*.
<https://www.transportation.gov/briefing-room/safetyfirst/us-department-transportation>

U.S. Department of Transportation. (2023, February). *Equitable Transportation Community Explorer (ETCE) Technical Documentation*.
<https://www.transportation.gov/sites/dot.gov/files/2023-02/ETCE-Technical-Documentation.pdf>

U.S. Department of Transportation. (2025, January 14). *What Is a Safe System Approach?*
<https://www.transportation.gov/safe-system-approach>

Vision Zero Network. (2025). *What is Vision Zero*. <https://visionzeronetwork.org/about/what-is-vision-zero/>

Vision Zero SF. (2021). *2021 Vision Zero SF Action Strategy*. https://www.visionzerosf.org/wp-content/uploads/2021/11/VZSF_AS_111021_spreads-FINAL.pdf