



Gender Analysis Concepts and Practices for Complete Streets

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FINAL REPORT

GENDER ANALYSIS CONCEPTS AND PRACTICES FOR COMPLETE STREETS

FINAL PROJECT REPORT

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Abstract

Complete Streets policies emphasize design for older and younger travelers as well as people with disabilities. Issues of gender, families, and caregiving are implicit in the idea of a Complete Street. Current Complete Streets policies, however, lack explicit consideration of gender, leaving communities with little guidance for operationalizing gender equity through transportation system design.

The studies that comprise this report take steps to apply gender analysis to the mechanics of Complete Streets policy, planning, and implementation. We center the effort on a case example of Milwaukee, WI, and we supplement this with data and experience from other regions such as Denver, CO, Tampa, FL, Pittsburgh, PA, and Madison, WI, to undertake the following objectives: 1) Identify the concepts, data, and methods needed to support a gender-aware Complete Streets movement; and 2) Demonstrate the use of these concepts and practices through pilot analyses and workshops with Milwaukee, WI and other communities. The deployment of emerging transportation technologies may provide a pivotal opportunity for communities to consider the interaction of gender and system design. Therefore, the analyses include consideration of ride hail, bike share, e-bikes, and other travel options.

We deployed multiple approaches and methods including literature review, synthesis of gender analysis and Complete Streets toolkits, content analysis of Complete Streets plans, quantitative analysis of gendered travel patterns, quantitative analysis of gendered walkability, qualitative analysis of gendered livability, and workshops about gender equity and social inclusion with Complete Streets practitioners and researchers.

We found that Complete Streets initiatives could directly improve gender equity outcomes and need to include social and cultural aspects of streets as public spaces in addition to physical design. Communities that desire gender awareness in their multimodal transportation planning could apply principles of gender mainstreaming. Gender awareness can be integrated into the existing Complete Streets planning process by examining data disaggregated by gender, including gender-specific questions on surveys (e.g., caregiving, security), and including women and gender minorities in leadership and decision-making processes. It is both appropriate and necessary to combine questions of gender with questions of race, ethnicity, religion, county of origin, and other identity factors that are as relevant to local communities as they are to transportation research. The effort to mainstream gender in Complete Streets can also serve as an opportunity to remove cisgender and heteronormative conventions in both the practice and study of transportation planning, policy, and design.

Chapter I: Introduction

Decades of research in transportation, urban design, and city planning confirm the existence of gender differences and inequities in travel and the social outcomes of transportation systems. In a comparative study of eight cities from three continents, Ng and Acker (2018) found that women across the world were more similar in their travel behaviors, such as their choice of travel mode, than women and men living in the same city.

In response to the gendered inequities embedded in these differences, research has supported practical strategies that could increase gender equity in transportation. Examples include expanding transit services, preventing harassment and gender violence, providing accessible pedestrian infrastructure, and building age-friendly environments (CIVITAS, 2014). Despite the pressing need to achieve gender equity in transportation, the recommended strategies to increase gender equity have not been sufficiently institutionalized in practice or policy.

We propose to use the widespread Complete Streets movement as a platform to institutionalize gender mainstreaming. Complete Streets policies already emphasize design for older and younger travelers as well as people with disabilities. Issues of gender, families, and caregiving are implicit in this idea of a Complete Street. On average, women have more household responsibility for accompanying younger, older, and less mobile travelers.

Current Complete Streets policies, however, lack explicit consideration of gender, leaving communities with little guidance for operationalizing gender equity through transportation system design. The Complete Streets movement would be strengthened by better attending to the complexities of gender and its relationship to travel and experiences in transportation systems. Hence, until gender is integrated into transportation designs and thinking, equity cannot be fully achieved for marginalized social groups—not by race, age, or ability, nor for pedestrians, cyclists, and transit riders.

Research Objectives

The studies that comprise this report take steps to apply gender analysis to the mechanics of Complete Streets policy, planning, and implementation. We center the effort on a case example of Milwaukee, WI, and we supplement this with data and experience from other regions such as Denver, CO, Tampa, FL, Pittsburgh, PA, and Madison, WI, to undertake the following objectives:

1. Identify the concepts, data, and methods needed to support a gender-aware Complete Streets movement.
2. Demonstrate the use of these concepts and practices through pilot analyses and workshops with Milwaukee, WI and other communities.

The deployment of emerging transportation technologies may provide a pivotal opportunity for communities to consider the interaction of gender and system design. Therefore, the analyses include consideration of ride hail, bike share, e-bikes, and other travel options.

Report Structure

The first part of this report addresses research question: What new concerns and approaches would gender-aware Complete Streets policies and implementation actions include? To answer this question, we synthesized the relevant literature and gender analysis toolkits. We apply information from the literature and toolkits to analyze a selection of Complete Streets plans. The analysis illustrates opportunities for gender equity to be included in Complete Streets planning practices.

The second part of the report elaborates on two opportunities to take next steps toward a gender-informed analysis and planning: 1) the collection and use of data in the Complete Streets planning process; and 2) the development of transformative transportation planning practices applied to Complete Streets. The second part of the report elaborates on these two findings with demonstrations of data analysis and practitioner engagement that foreground gender equity.

In line with our commitment to put theory into practice, we write for an audience of researchers, practitioners, and anyone who works across these categories.

Chapter II: Analytical Approach

Conceptual Framework

We propose building gender awareness into the Complete Streets movement with a feminist approach grounded in transportation and planning research (Law, 1999; Hanson, 2010; Sánchez de Madariaga, 2013; Rosenbloom et al., 2020). A feminist approach to Complete Streets is not simply about women’s travel and experiences; it is a framework that recognizes gender as a determining factor in one’s travel, participation in social and economic activities, and experience. In turn, this framework values embodied experiences of transportation environments—to move, orient, sense, perceive, interact, and find one’s way—as sources of knowledge about transportation, especially from historically underrepresented groups.

Far from a theoretical preference, connecting Complete Streets and gender equity in transportation demands a feminist approach. First, traveling is a social and political process, not a simple outcome of a travel optimization problem. Second, streets represent more than the physical manifestation of abstract engineering standards; they are dynamic places where quotidian travel carries meaning and, therefore, contributes to placemaking and even one’s sense of self. Without a feminist lens on the diversity and fluidity of travelers’ identities and experiences, attempts at gender equity through Complete Streets will be stifled by limited and universalizing interventions.

Study Area and Partnerships

This study centers on Milwaukee, WI as a case example of Complete Streets policy development and implementation. In 2018, Milwaukee formally adopted its Complete Streets policy. This policy change resulted from a collaborative effort between the Milwaukee Department of Public Works (DPW), Common Council, other city departments, community advocates, and researchers.

Milwaukee’s Complete Streets policy embraces equity and social justice. It states the objective to “maximize the comfort, safety, and needs of all users, of all ages and abilities, whether travelling by foot by using mobility aids/devices, by transit, by bicycle, or by motor vehicle, including freight/delivery” (City of Milwaukee, 2018).

The city prioritizes implementing Complete Streets projects in two types of conditions: 1) within Neighborhood Revitalization Strategy Areas (NRSAs)—locations with disparities in public health, access to diverse transportation options, crash rates, education, and income; and 2) within the

Pedestrian High Injury Network (PHIN), which includes 106 miles of streets with high crash, injury, and reckless driving rates (City of Milwaukee, 2019). The city’s focus on locations with the highest needs is emphasized in the Complete Streets Health and Equity Report (City of Milwaukee, 2020).

Community engagement has guided Milwaukee’s development and implementation of the Complete Streets policy. The DPW and community members have held pre- and post-project walks to have informal conversations about pedestrian and mobility issues that existed before project implementation and how the projects have affected the issues. The city has conducted in-person and online surveys for a proposed bike/walk sign and wayfinding plan (City of Milwaukee, 2019). The city also conducted a Safe and Healthy Streets survey in 2020 to collect baseline data about residents’ enjoyment of walking, bicycling, and other types of transportation, including their perceptions of traffic safety and personal security while using different travel modes. This survey will be repeated in future years to benchmark progress implementing Complete Streets.

Literature Reviews

To the best of our knowledge, only three studies have made a direct connection between Complete Streets and gender. Jensen et al. (2017) asked whether newly renovated Complete Streets in Salt Lake City, Utah would attract relatively more women compared to conventional streets (answer: they might, but women still represented only 29% of users). Keippel et al. (2017) analyzed a case study of Billings, Montana where a “Healthy by Design Coalition” successfully advocated for a Complete Streets policy by calling attention to gender disparities in physical activity. The third study investigated whether the application of bus rapid transit and Complete Streets in Mexico City increased walking. It found that the interventions affected women more than men, and particularly women with lower socioeconomic status (Chang et al., 2017).

Because so few studies focus on gender and Complete Streets, we searched the larger academic and grey literature on gender, public space, and multimodal transportation, which spans decades and crosses several disciplines. The interdisciplinarity of the topic motivates our use of multiple journal databases. Web of Science provided broad coverage of the general academic literature. PubMed covered biomedical and health topics. The Transportation Research International Documentation (TRID) database focused specifically on transportation-related references. We organize the discussion into two parts. The first covers gender, multimodal transportation, and public space. The second specializes in emerging transportation technologies and travel modes.

Gender, Multimodal Transportation, and Public Space

We conducted a literature review that synthesized the abundant literature on gender, multimodal transportation, and public space—three topics that overlap with and expand on themes of Complete Streets.

We used three categories of search terms to query each database (Table 1). Category 1 covered gender (and sexuality) terms, including gender, women, or LGBT* (Lesbian, Gay, Bisexual, and Transgender) and specified that the terms needed to be included in the title to identify articles where these issues were the central topic. Category 2 is related to travel behavior and street environments, encompassed by terms such as travel, transport, street, road, design, public space, safety, or security. Category 3 specified different modes of transportation to ensure that articles covered pedestrians and cyclists, as well as various types of public transit and private vehicles. Our search terms were in English, but the search settings allowed results in any language; subsequent hand searching included search terms in Spanish.

Table 1. Gender, Multimodal Transportation, and Public Space Literature Search Terms and Descriptions

Category	Description	Search terms
1	Emphasis on gender concepts, empirical information; search term must be in the title	Gender Wom* LGBT* Homosexual Lesbian Gay Bisexual Transgender
2	Conventional Complete Streets discourse about travel behavior and environmental design; search term anywhere in the record	Transport* Travel Street* Road* Design "Public space" Safety Security
3	Conventional Complete Streets discourse about travel modes; search term anywhere in the record	Bike Bicycl* Cyclist Walk* Pedestrian Transit Bus

		Rail "Public transport" Car Truck Automobile Motorist
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The initial queries produced 3,390 records, of which 2,622 were unique references after removing duplicates. We conducted an initial screening of the 2,622 titles, looking for studies on transportation, streets, built environments, travel behavior, vehicles, and other topics that relate to Complete Streets policy, planning, and design, broadly defined. We excluded many articles with a medical perspective that lacked significance for transportation. This stage narrowed the references to 1,144.

The second round of screening involved reading all 1,144 remaining article abstracts. In addition to applying the first-round criteria, we excluded references that used biological sex simply as a binary covariate or that studied women without indicating the relevance of gender. We made exceptions for articles that presented underrepresented perspectives by race, age, ability, or geographic region (usually public health studies of physical activity). This second round of screening narrowed the number of references to 718.

As a final screening step, we skimmed these 718 articles and prioritized studies that used original quantitative or qualitative evidence or deployed secondary data; this excluded thought pieces and reviews from the formal analysis, though we used them as framing documents. This narrowed our list to 417 references highly relevant to our research question and themes of Complete Streets. We supplemented these 417 articles with hand searching in English and Spanish that provided better coverage of the literature on queer perspectives on transportation and the grey literature on gender and transportation (N=34, these are not included in the quantitative summary).

We performed an exploratory analysis of 80 full-text articles after the first-round screening by title to establish a qualitative coding vocabulary to analyze the content of each abstract and article. We refined the qualitative codes through several rounds of group discussion until they concisely yet faithfully represented the topics of the abstracts and articles. The codes were: 1) travel behavior; 2) social/cultural norms; 3) street environments and public space; 4) intersectional considerations; 5) policies, plans, and implementation; and 6) human factors, ergonomics, and physiological sex differences. The third category—street environments and public space—included several subtopics, including 3A) infrastructure and the built environment; 3B) safety from traffic; 3C)

perceptions of built environments; 3D) security from crime and harassment; 3E) social space; and 3F) vehicles. In Table 2 we also note whether these topics are typically included in Complete Streets discourse.

The majority of articles and abstracts integrated travel behavior, social norms, street design, and public space instead of treating them as stand-alone or disconnected topics. One-third of articles included discussion of streets and public spaces, often going beyond infrastructure to highlight perceptions of public space or the social environments that streets create. Another one-third of the articles offered intersectional analyses. About a quarter of the articles addressed planning, policy, and implementation issues. A minority of the articles considered human factors, ergonomics, and sex-based factors; most of these studied the use of seatbelts during pregnancy. In sum, these articles show the scope of documented knowledge about gender, multimodal transportation, and public space that could be integrated into Complete Streets.

Table 2. Summary of Gender, Multimodal Transportation, and Public Space Articles Reviewed

Code	Example topics	Number of articles (%)	Number of abstracts (%)	Part of existing CS discourse?
1. Travel behavior	Gendered differences in travel mode, purpose, and distance; Vehicle access	331 (79%)	506 (70%)	Partial
2. Social/cultural norms	Gendered labor market participation; Misogyny; Homophobia; Transphobia	262 (63%)	379 (53%)	No
3. Street environment & public space	See subcategories 3A–3F	232 (56%)	272 (38%)	--
3A. Infrastructure, built environment	Perceptions of street design, bicycle facilities, sidewalk connectivity	174 (42%)	212 (30%)	Partial
3B. Safety from traffic	Crash and injury risk; Engineering, enforcement, and education strategies to improve safety	136 (33%)	191 (27%)	Partial
3C. Perceptions of environments	Perceived risk of sexual harassment; Perception of neighborhood walkability	163 (39%)	194 (27%)	No
3D. Security from crime, harassment	Transit agency responses to crime; Influence of (in)security on walking/transit	133 (32%)	156 (22%)	No
3E. Social space	How people feel and interact in public space and gendered differences in the experience of this space	132 (32%)	157 (22%)	No
3F. Vehicles	Gendered experiences with driving, vehicle technologies	124 (30%)	153 (21%)	No
4. Intersectional considerations	Differences in gendered feelings of safety walking at night by race, ethnicity, ability, and SES	143 (34%)	197 (27%)	Partial
5. Plans, policies, & implementation	Gender mainstreaming, gender in climate change mitigation policy, and studies with policy- or implementation-related recommendations	116 (28%)	176 (25%)	Partial

6. Human factors, ergonomics, & physiological sex differences	Seat belt compliance during pregnancy; mental health recovery from traffic injury; population-level differences between certain characteristics of male and female bodies	25 (6%)	29 (4%)	No
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We designed a database for documenting basic information about each abstract and article (e.g., citation, research method, study area, sample size, and main findings) including these qualitative codes. Research team members read and coded the 718 abstracts and 417 articles included in the study. The PIs audited the team’s article coding by scanning the articles again to ensure that each entry was complete and accurate.

Gender and Emerging Travel Modes

We conducted a second review of literature with an emphasis on gender and emerging travel modes. Research articles were gathered with the three databases (TRID, Web of Science, and PubMed). In the first search, articles were located using the following sets of search terms: (1) "Gender" AND "Transport*" AND "Technolog*" AND "Mobility"; (2) "Gender" AND "Transport*" AND "Technolog*"; (3) “Gender” AND "Complete Street"; and (4) “Gender” AND "Smart Cit*".

The articles were then narrowed down utilizing the following criteria. First, we excluded articles that were not relevant to personal transportation were excluded, primarily medical articles unrelated to this study. Articles utilizing gender only as a variable in statistical analyses but not discussing any findings related to gender, along with articles indicating gendered differences that are unrelated to physical urban form, were excluded. Articles that specifically referenced cultural and social differences related to gender, and in particular gender differences in developing countries, were not reviewed due to their inability to be applied to the context of our research in the United States. Other topics were decided to be outside the scope of or project and were therefore not explored, such as autonomous vehicles and car safety features and design. Table 3 presents a summary of the database search terms and results.

Table 3. Summary of Gender and Emerging Travel Modes Search Results

Search #	Database	Terms used	Results	Relevant articles
1	Web of Science	"Gender" AND "transport*" AND "Technolog*" AND "mobility"	2	2
2	Web of Science	"Gender" AND "transport*" AND "Technolog*"	180	10

3	PubMed	"Gender" AND "transport*" AND "Technolog*" AND "mobility"	17	2
4	Pubmed	"Gender" AND "transport*" AND "Technolog*"	536	8
5	TRID	"Gender" AND "transport*" AND "Technolog*"	579	18
6	TRID	"Gender" AND "transport*" AND "Technolog*" AND "mobility"	95	6
7	Web of Science	"Gender" AND "Complete Street"	2	2
8	PubMed	"Gender" AND "Complete Street"	1	1
9	TRID	"Gender" AND "Complete Street"	2	1
10	Web of Science	"Gender" AND "Smart Cit*"	21	1
11	PubMed	"Gender" AND "Smart Cit*"	0	0
12	TRID	"Gender" AND "Smart Cit*"	2	1

Scan of Toolkits for Gender Analysis and Complete Streets

To identify methods for applying a gender-based analysis to Complete Streets policies, we searched across Google and journal databases to identify gender analysis tools, policies, and techniques from around the world. We searched the following databases: Transport Research International Documentation (TRID), SAGE Journals, Journal of International Development, Elsevier. The following search terms were used: gender analysis, gender analysis Complete Streets, gender analysis toolkit, gender analysis policy, gender analysis transportation.

The resulting scan included toolkits or policies that provided specific guidance on how to analyze, assess, and/or audit government practices using a gender lens. The review included gender analysis tools that were related to any public service, including but not limited to transportation and mobility. Also included were successful policies developed through gender analysis. The specific inclusion criteria were toolkits or policies that were developed after 2005, offered specific guidance on methods for developing gender analysis in population-level projects, and referenced transportation.

Scan of Complete Streets Plans

We conducted a scan of recent Complete Streets plans to understand the current state of practice with a focus on gender and social inclusion. Our main research question was: How, if at all, do Complete Streets plans approach issues of gender equity and social inclusion more broadly? How do they describe and define social inclusion and what strategies, if any, do they use to bring about these outcomes?

We identified plans based on the inventory maintained by Smart Growth America, which was last updated in June 2021 (Smart Growth America, 2021). We filtered for plans and design guidelines created for cities in or after 2010. The selection criteria omitted policies and resolutions, excluded regional, state, and county plans, and older plans. Of the N=82 results, we screened out 23 documents we were unable to locate or that were miscategorized. We skimmed N=59 plans to evaluate their vision statements and substantive analysis to find language, images, data analysis or other examples where the authors introduced ideas of diversity. In this analysis we highlight N=11 exemplar plans that indicate attention to social inclusion, if not gender equity, and that represent diverse populations, areas of the country, and local transportation issues (Table 4). These 11 plans may not be representative of all Complete Streets plans in the US but each one stood out by offering a unique perspective on the question of gender equity and social inclusion.

Table 4. Complete Streets Plans Included in the Content Analysis

Community	Year	Title
Fayetteville, AR	2020	Fayetteville Mobility Plan
Los Angeles, CA	2015	Great Streets for Los Angeles Strategic Plan
Manteca, CA	2020	City of Manteca Active Transportation Plan
Brevard County, FL	2019	Bicycle and Pedestrian Master Plan
Indian River County, FL	2015	Bicycle and Pedestrian Master Plan
Jacksonville, FL	2017	Pedestrian and Bicycle Master Plan
St. Petersburg, FL	2019	Complete Streets Implementation Plan
Ames, IA	2018	Complete Streets Plan
Highland Park, IL	2012	Bike-Walk HP 2030
Lenexa, KS	2019	Complete Streets Plan
Portland, OR	2021	Transportation System Plan

We created a data collection instrument based on gender analysis guidance described in Chapter V of this report. The data collection instrument covered three categories of questions that we applied to each plan:

Part 1. Stated Purpose and Goals for Social Inclusion.

1. [Broadly] What does the plan say about social inclusion?
2. [Focusing on travel modes]. How does the plan present diversity within and across populations of pedestrians, cyclists, transit riders, and motorists?
3. [Gender relations]. What does the plan explicitly say about the travel-related needs of women, men, girls, boys, and gender minorities?

Part 2. Community Engagement, Data Collection, and Data Analysis

4. [Process] Does the plan mention community engagement where women and gender minorities have been consulted?
5. [Data] Does the plan disaggregate data by gender or sex? If so, what data?

Part 3. Interpretation

6. [Potential outcomes] What does the plan propose as material, procedural, or symbolic changes to the transportation system that would make it more inclusive?
7. [One step closer to gender equity] What are specific moments in the plan that could be expanded to move one step closer to gender equity?

We answered these questions using data (original language and images) from the plans. In our reading of the plans, we gave special attention to language about the travel needs of men, women, boys, girls, gender minorities, and caregivers (including parents). We also gave special attention to social characteristics that we know are salient in the Complete Streets rhetoric, such as age and ability, as well as socio-economic status, race, ethnicity, or other factors associated with transportation equity.

For example, we read plans to see if any had deployed a community engagement process specifically designed to include perspectives of women and gender minorities who can identify unique transportation issues? We also looked for plans that used specific data or performance measures that disaggregate information by sex or gender.

Although most plans did not offer visions of social equity beyond the inclusion of cyclists, pedestrians, and transit riders, several plans offered exemplar points of entry into deeper discussions of gender and social inclusion. We applied lessons from the literature review to the plan analysis to help imagine a more transformative Complete Streets planning practice. This analysis also helped us prepare to host workshops with Complete Streets practitioners.

Analysis of Secondary Data

Access to sufficient data for multimodal transportations system planning and design remains a challenge in general, not only for questions of gender equity. Available data sets sometimes include information that allows for analysis stratified by gender. We conducted exploratory

analyses of commonly available secondary data sets (American Community Survey, National Household Travel Survey) as well as bespoke local data, to evaluate their utility for gender analysis in Complete Streets planning.

Quantitative Analysis of Travel Patterns by Gender

National data sources, such as the American Community Survey (ACS) and Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LODES), are widely available and include information on gender and personal travel. Their utility for Complete Streets planning, however, is limited by their focus on working adults and the work commute, which excludes travel for caregiving, domestic activities, recreation, and other purposes.

Wisconsin is among the states with an Add-on sample to the National Household Travel Survey (NHTS) that provides detailed information about all types of travel including care-related trips. The 2017 NHTS Wisconsin Add-on includes 24,416 persons in 11,675 households associated with 57,040 locations. Among them, 1,854 households with members who lived, worked, or visited Milwaukee at 4,484 unique locations during the travel survey day.

We conducted a practice-ready descriptive analysis of the Wisconsin Add-on to the NHTS with a focus on the 1,854 households in the Milwaukee study area. These households included 3,954 persons. Among them, 2,760 traveled, including 2,402 who were over 16 years old and 358 children under 16. We examined their general mobility patterns, analyzed gender differences in trip characteristics, and examined patterns in the mobility of care.

Quantitative Analysis of Perceived Walkability by Gender

We also analyzed the 2020 Milwaukee Safe and Healthy Streets survey, which was designed to collect information about resident perceptions of streets in the City of Milwaukee. The survey was completed by N=801 respondents across all 15 alder districts (158 responses came from surveys mailed to random addresses with a stamped return envelope, and 643 came from an online link shared by e-mail and social media). This survey is an exemplar of the bespoke data collection undertaken by communities to support their Complete Streets planning processes.

We analyzed the survey responses to 1) gain a deeper understanding of resident perceptions of walking, bicycling, and other types of transportation and place-based perceptions of Milwaukee

neighborhoods; 2) demonstrate the use of a secondary dataset to address questions of traffic safety and personal security, important themes in the literature on gender and transportation.

The survey asked residents to rate their experience for numerous travel modes (walking, biking, public transportation, automobile) within their neighborhoods. The survey asked other relevant questions related to perceptions of traffic safety and personal security, cleanliness of the neighborhood, and the qualities of environments that promoted active living (e.g., lighting, pavements/sidewalks, destinations, amenities, aesthetics, social opportunities). Residents rated their perceptions on a 5-point scale ranging from “Very Good” to “Very Poor” or their equivalent based on the theme of the question.

Qualitative Analysis of Perceived Livability by Gender

Open-ended survey questions can provide further insight into aspects of Complete Streets that are difficult to analyze with quantitative methods. We used qualitative coding of open-ended survey questions to analyze gender differences in one’s perceptions of travel and mobility, social environments, and physical/built environments that are relevant to Complete Streets.

We applied this approach to a data set that is representative of the types of local surveys used in Complete Streets planning processes. The dataset comes from Denver, Colorado, and was originally collected in 2015 for a livability study (described further in Marshall and McAndrews, 2017 and McAndrews and Marshall, 2018). The survey, which was distributed to households in neighborhoods surrounding commercial nodes along major arterial roads, included four open-ended questions in addition to several closed-form questions:

1. What are some things you like or dislike about your street?
2. What are the best features of your neighborhood?
3. What are the worst features of your neighborhood?
4. Is there anything else you like or dislike about [nearest arterial corridor]?

The Denver survey included N=724 responses (N=290 male, N=380 female). The four open-ended questions generated N=2,709 unique responses from women and N=1,765 unique responses from men; each respondent could provide multiple responses.

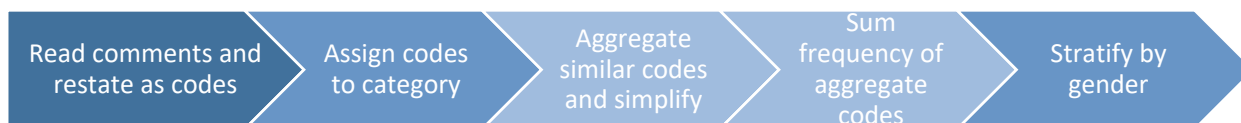
We read, interpreted, and coded individual responses to each open-ended question using an iterative process (Figure 1). First, we read each comment and restated the main ideas in a few

words or short phrases. The words and phrases (codes) are specific enough to capture the original meaning of the text, but general enough to represent similar thoughts of other individuals in the sample that may have worded their response differently.

Next, based on the dominant themes from the literature and the survey responses, we assigned each code to a category: 1) travel/mobility positive or negative; 2) social environment positive or negative; or 3) physical environment positive or negative. For example, a comment about friendly neighbors would be assigned to the positive social environment category.

We examined the frequencies of the codes within each of the three categories and stratified them by gender. We performed a chi square test to check for statistically significant differences between the men's and women's perceptions based on the frequency with which a code was mentioned.

Figure 1. Qualitative Analysis Process for Livability Survey



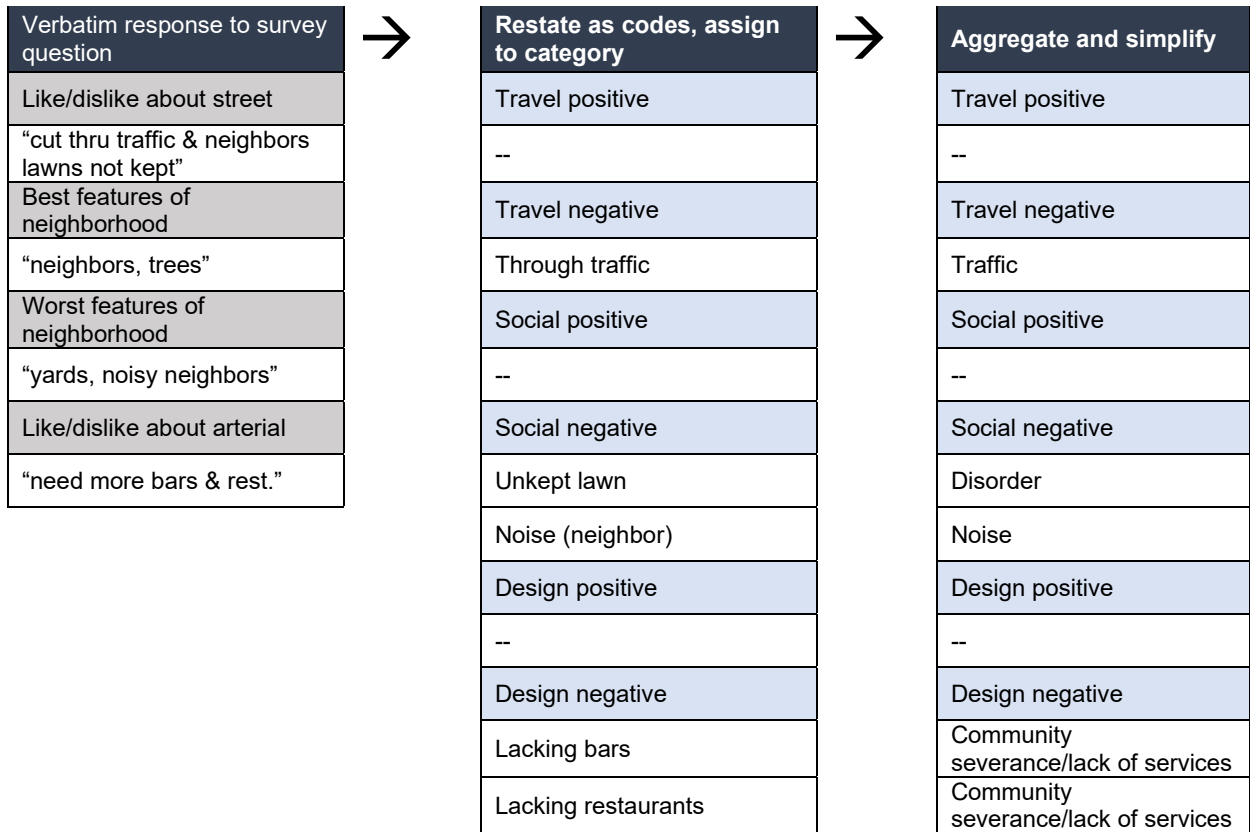
Workshops with Complete Streets Practitioners and Researchers

Part of our research process was to engage in a collective effort among Complete Streets practitioners and researchers to explore how intersectional gender analysis might increase impact, equity, and inclusion of Complete Streets. During our planning of a workshop to accomplish this we identified a holistic sustainability framework, and engagement with the arts as two necessary complements to the gender analysis. All three of these perspectives are needed to more fully characterize mobility, transportation system performance, and the human experience of streets as public spaces. Therefore we planned a series of three workshops to carry out a multi-dimensional review, with the aim of making recommendations about how to optimize transportation strategies, increase equity, and more completely realize the potential of Complete Streets to foster wellbeing. Through the workshops we would also begin to develop tools and approaches for transformative practice and leadership.

The first workshop, held in the summer of 2021, included 16 practitioners and researchers with expertise in Complete Streets. Participants briefly reviewed all three analytical lenses, and then focused on gender analysis. The four-hour program included presentations, group discussion, and small group discussions in which participants applied gender analysis to the National Complete

Streets Coalition and Smart Growth America’s Complete Streets policy guidance. Chapter X provides a summary of the meeting. The additional workshops on sustainability and the arts will be held in that fall of 2021. Results of the three workshops will be summarized and shared with the Complete Streets coalition and within our professional networks.

Figure 2. Example of Coding, Category Assignment, and Stratification of Livability Survey Responses



Chapter III: Review of Literature on Gender, Multimodal Transportation, and Public Space

Few Existing Research Studies Examine Gender in the Context of Complete Streets

A small number of communities have considered gender in their Complete Streets policies, but their implementation has been too recent for full evaluation of the gender-focused approaches. Preliminary data for Billings, MT indicate that the gender-focused interventions and their Complete Streets policy have contributed to the increase in leisure time physical activity among women, though no study has analyzed the impact of individual interventions. The baseline in a 2010/2011 Community Health Needs Assessment indicated 27.2% of women versus 17.2% of men reported no leisure time physical activity while in 2016/2017 this disparity decreased to 19.8% of women and 15.04% of men (Keippel et al. 2017).

Though some studies have looked at changes before and after Complete Street renovations, none aside from Jensen et al. (2017) used gender as a variable of study. The study looked at four streets, each one subjected to three rounds of pedestrian counts. Two of the four streets received Complete Streets renovations between the first and second rounds of pedestrians counts. The four streets were classified based on the walkability and Complete Street status as follows. The Complete-Urban street bordered the Central Business District and received a Complete Streets renovation. The Complete-Less Urban street also received a Complete Streets renovation, though it was located farther from the Central Business District and consisted of more mixed uses consistent with less-urban environments. Two comparison streets were then used that did not receive Complete Streets renovations. One of the comparison streets was classified as Low-Walkable, featuring four lanes of traffic, 40 mph speed limit, commercial properties, empty fields, long street segments, missing sidewalks, and automobile-oriented sites, while the other was classified as High-Walkable, benefiting from short street segments, lower speed limits, complete sidewalks, several small businesses, restaurants, bars, single-family detached homes, street trees, and a public park. These streets were also rated using the Irvine Minnesota Inventory (IMI) for walkability to objectively confirm their walkability status. The Low-Walkable street scored the lowest on the IMI, while the High-Walkable street scored the highest. Prior to their Complete Streets Renovation, the Complete-Urban and Complete-Less Urban streets scored between the Low- and High-Walkable streets in terms of walkability. (Jensen et al. 2017).

Overall, Jensen et al. (2017) concluded that Complete Street modifications might enhance walkability and draw more people, as they resulted in several instances of increased use. Regarding

gender differences, it is unclear if women are attracted to the more walkable design, the greater number of users, or both. Jensen et al. (2017) also proposed that determining a standard set of proportions for male and female users could allow planners to observe through simple gender counts when female proportions fall too low, indicating a need for street improvements. The table below summarizes the project’s three main aims and findings.

Table 5. Summary of Findings from a Research Study about Gender and Complete Streets

Compared to less walkable streets, do more walkable streets have more total people and females?
Low-Walkable street always had significantly fewer users than the streets with more walkable features
Complete-Less Urban street had typically fewer people than the Complete-Urban and High-Walkable streets
Low-Walkable street had fewer females and males than all other streets
For females, the Complete-Less Urban has less use than the two most walkable streets
Does street use increase following Complete Street renovations, and is the increase sustained?
Over time there were decreasing numbers of users on the Low-Walkable street and increasing numbers of users on the High-Walkable street
Complete-Less Urban street had a significant increase in users from baseline at time 2 for weekdays and times 2 and 3 for weekends
Complete-Urban street had a significant increase in weekday users from baseline at time 2
Overall, there were visible increases in users on the Complete Streets, which appeared to peak around the location of the new rail stops
Are proportionally fewer females than males using streets and does this vary by walkability?
Females made up proportionally only 0.29 of total weekday and weekend users, though census data indicates that about 47% of nearby residents were female
The proportion of females on the Low-Walkable street was 0.19 (weekdays) or 0.21 (weekends) compared to 0.40 (weekdays) or 0.42 (weekends) on the High-Walkable street
The proportion of females using the complete streets were not statistically different from each other, though they were statistically different from the Low-Walkable and High-Walkable proportions
The proportion of females on the Complete-Less Urban street was 0.27 (weekdays) or 0.26 (weekends) compared to 0.30 (weekdays) and 0.27 (weekends)
Regardless of the street, people were more likely to encounter males than females
Low-Walkable street had 426% (weekdays) or 376% (weekends) more males than females
High-Walkable street had 150% (weekday) or 138% (weekends) more males than females
The gender imbalance on streets was never equal but grew closer to equality when the street was more walkable

An Expansive Literature Examines Gender, Multimodal Transportation, and Public Space

We expanded the literature review beyond studies of Complete Streets and used the abundant and methodologically diverse literatures on gender, multimodal transportation, and public space as an analytic through which we could reimagine how Complete Streets could advance gender equity. We scoped the review around the research question: What new concerns and approaches would gender-aware Complete Streets policies and implementation actions include?

Through this expanded literature review, we identify relevant: 1) empirical information about gender norms, roles, and relations in the context of multimodal travel (e.g., walkability measures, travel behavior, safety); 2) gender concepts that matter for multimodal transportation and public space; and 3) regional cases and examples of gender mainstreaming in multimodal transportation (and potentially different experiences across regions).

The literature covers several regions, languages, and cultural contexts. The majority of the 417 studies were from North America (32%), followed by Europe (26%), Asia (15%), Australia and New Zealand (6%), Central and South America (4%), the Middle East (3%), and Africa (2%). The places most often studied were the US (105, including studies from 22 different states), the UK (22), Australia (21), India (18), Canada (16), China (9), Mexico (9), and Pakistan (8). Most (95%) were written after 2000, including 77% since 2010. We read articles in English, Spanish, German, Portuguese, and Italian. Similar proportions focused on pedestrians (19%), bicycle (16%), transit (14%), and automobile travel (19%), and the remaining 32% covered a mix of travel behavior, policy, physical activity, and public space research.

Each study was individually focused on a small geographic region and highlights that their ability to transfer the findings from that location to another may be difficult. It is difficult to generalize any findings to fit any location, but the following information stand out as trends found in a number of studies.

Studies used various quantitative and qualitative methods; despite their epistemic and methodological variety, nearly all studies used binary gender categories and heteronormative constructs. Quantitative studies typically analyzed survey data to understand gendered travel behavior as well as crash and injury data to investigate differential injury risk by gender. Papers that examined travelers' perceptions of public space were more likely to use qualitative approaches from the social sciences and humanities. Constructs based on perceptions of public space (as a complement to objective measures of public space) are salient in the literatures on physical activity, placemaking, and multimodal transportation. These literatures indicate the need for both qualitative and quantitative research to inform transportation engineering and policy, which is consistent with a feminist approach to Complete Streets that legitimizes qualitative studies of subjective knowledge and its application to practice.

The relevant literature reaches audiences through diverse modes of academic production and distribution. In addition to peer-reviewed articles in traditional academic journals, it includes decades of well-cited conference proceedings and special issues of journals (e.g., de Gregorio

Hurtado and Novella Abril, 2016; TRB, 2005). Non-academic databases led us to many critical sources: a steady stream of reports from government agencies and non-governmental organizations that contribute to the state of the art of the field (European Institute for Gender Equality 2016).

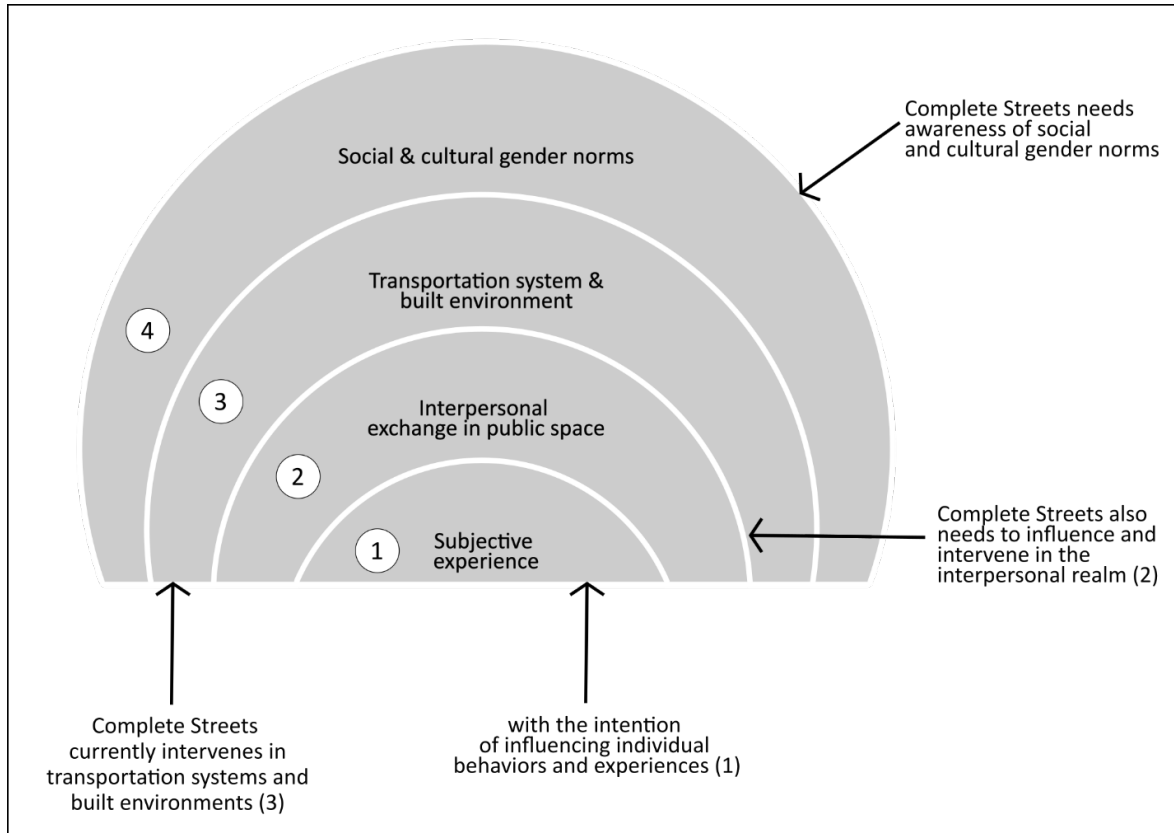
Application of Gender Equity Concepts in the Literature to Complete Streets

Given the diversity of the literature and data types, we utilized the social-ecological model to draw and analyze connections between topics in the literature and those of concern to Complete Streets—in both its current form and looking toward ways to advance gender equity (Figure 2). The social-ecological model is suitable for this analysis because it posits relationships between subjective experiences in the transportation system (e.g., the decision to walk) and the influence of upstream factors (e.g., built environments, social norms, and policies) that enhance or limit one's experiences and behaviors (Sallis and Owen, 2015). It asserts that: 1) travelers' perceptions of the transportation system are legitimate sources of knowledge; and 2) that travelers not only interact with physical spaces but also prevailing social norms, design standards, and policies ideas.

The model provides a structure to organize the embodied knowledge that arises in the literature. Its different levels correspond to findings in the literature and help us identify both the areas in which practitioners can most effectively advance gender equity and areas where new voices and stakeholders can participate in imagining and implementing Complete Streets interventions.

Level 1 describes the subjective experience of an individual traveler and their personal characteristics. Complete Streets interventions can influence individual behaviors, perceptions, experiences by increasing one's perception of safety. For example, people perceive places with lower traffic speeds as safer than roads with high traffic speeds. Level 2 describes interpersonal exchanges in public space, which is salient in the literatures on sexual harassment and placemaking. Level 3 refers to the built environment, which is the focus of the existing Complete Streets policies that contend to change the physical form and operation of transportation systems. Level 3 is usually considered together with Level 1, such that changes in the built environment could influence a person's subjective experience of travel (e.g., their perception of safety). Level 4 involves social norms, such as the norms of gendered behavior. Social norms are also associated with Level 1 because they affect a person's subjective experience of travel, as well as with Level 2 because they are present in street-level interpersonal exchanges that could communicate respectful norms of safety and inclusion.

Figure 2. Gender Awareness in Complete Streets Design Operates at Multiple Levels



Complete Streets Can Advance Gender Equity

We use the existing literature to analyze where Complete Streets is already doing gender equity work, but perhaps unknowingly and without naming it as such, and where this work is absent in its practices and discourse. For this analysis, we distill the existing Complete Streets discourse into the following argument: Complete Streets policies and plans, when implemented, result in multimodal infrastructure that makes walking and cycling safer and more convenient, which will prompt travelers (of all ages and abilities) to change their travel behavior and increase their walking, cycling, and transit ridership.

Travel Behavior

Research about travel behavior consistently shows that, globally, women are more likely than men to walk and ride public transit and are less likely to be cyclists. Further, women have lower access to cars, smaller activity spaces, tend to work at home or jobs closer to home, conduct more caregiving activities, and are more likely to stop driving as older adults (Scheiner and Holz-Rau, 2012; Sánchez de Madariaga, 2013). Many of these patterns are more pronounced in heterosexual relationships, but also hold true in same-sex partnerships (Smart et al. 2017). The differences in travel behavior within any gender must also be considered and depend on household composition, employment status, race, age, ability, and other identity factors.

In short, systemic underinvestment in multimodal transportation disproportionately constrains the mobility of women and people who have caregiving responsibilities. Complete Streets initiatives, which have resulted in infrastructure investments that improve the accessibility and safety of walking, bicycling, and transit, could directly improve gender equity outcomes by reducing these constraints. Moreover, such investment can potentially benefit gender equity indirectly by facilitating the independent mobility of older and younger travelers who may be non-drivers or dependent on caregivers.

Most travel behavior studies in the United States, including the National Household Travel Survey (NHTS), show that women make more daily trips than men, but they travel fewer miles. Citing the 2001 NHTS, Rosenbloom found that women traveled an average of 26.9 miles per day across all age groups, compared to the 42.9 miles per day that men traveled on average (Rosenbloom 2006). This aligns with Rosenbloom's (2006) own research which found that women are more likely to make linked or chain trips, making many stops between one origin and the final destination. Similar findings appear as far back as the 1990 Nationwide Personal Transportation Survey, the historical version of the NHTS administered by the Federal Highway Administration. The 1990 NPTS showed that women are 37% more likely than men to make chain trips (Strathman and Dueker, 1995). McGuckin and Murakami (1999) reported similar findings based on the 1995 NPTS, which showed that over 61% of women make at least one stop after work, and more than a quarter of women make two or more stops after work. Comparatively, just over 46% of men make at least one stop after work, and less than 20% of men make two stops or more. Most people, men or women, do not make stops on their way to work (McGuckin and Murakami 1999). Women were found to make these trips more often because they make more household-related trips than men (Rosenbloom, 2006), a trend that was also found among public transit riders in Los Angeles County (Los Angeles County Metropolitan Transportation Authority [LA Metro], 2019).

Nationally, this trend is persistent regardless of whether women are married, have children, or work full time (Rosenbloom, 2006).

These findings are largely based on self-reporting in travel diaries, which can result in misreporting. Travel diaries are also cross-sectional and evaluate travel behavior over a single 24-hour window. In 2004, Georgia Tech conducted the Commute Atlanta Instrumented Vehicle study to evaluate 2-day travel behavior based on GPS data across Atlanta (Elango et al, 2007; Ogle et al., 2005). Participants completed a travel diary and plugged a GPS device into the cigarette lighter of their car (Ogle et al., 2005). The Commute Atlanta data had results that were different from the NHTS and NPTS data. The Commute Atlanta data showed that men were more likely than women to make stops along their trip. The data was consistent with national studies in showing that men travel more miles than women: 16.42 average daily miles for men and 14.77 miles for women (Li et al., 2005). The authors acknowledge that these results should not be directly compared to results from national travel studies because the sample size was more affluent and owned more cars than the average Atlanta resident. Nonetheless, the Commute Atlanta study shows that including GPS data may counteract underreporting in travel studies (Li et al., 2005).

Another important finding is that women spend more of their travel time accompanying other people. This may include young children as well as older travelers with limited mobility (Rosenbloom, 2006, LA Metro, 2019). This is particularly true when looking at the travel behaviors of single mothers, who spend more time than married parents traveling and chauffeuring their children. Single mothers are also more likely to use a car rather than public transportation (Rosenbloom 2006). Because women are more often responsible for the mobility of other people, women spend more money on fares, and more time navigating strollers and wheelchairs in public transit (LA Metro, 2019).

When looking at the intersection of gender and age, there are considerable issues facing older women, especially women over the age of 65. Women older than 65 are four times more likely to be widowed compared to men, and 20% more likely than men the same age to be divorced. Women older than 65 are also more likely to live alone, have lower incomes or live in poverty, and live in areas that are lower density such as suburbs or rural areas. This leads to a greater number of older women being “stranded” without a means of accessing transportation (Rosenbloom, 2006; Rosenbloom and Herbel, 2009). Older women are also more likely to self-regulate and give up driving at earlier ages than men, resulting in women comprising 85% of all public transit ridership among people older than 65 (Rosenbloom, 2006). Finally, there are important safety concerns for older women. The proportion of older women in fatal car crashes is larger than the proportion of

older women in the general population. Whether older women are driving or are passengers, they are more likely than men of the same age group to be seriously injured in a crash (Rosenbloom 2009).

Walking

There is limited literature available regarding differences in walking routes or behaviors between men and women. However, the studies that do exist tend to find that streets that are less walkable are used by fewer people and proportionally less women than more walkable streets. One study found that on both weekdays and weekends the number females observed walking on the street were less than one-third the number of males (Jensen et al. 2017). Compared to men, women are also more likely to walk if they perceive a place as pleasant or if it is a complete street (Brown & Smith 2017). These studies have not been able to identify if the greater number of women should be attributed to the more walkable design, higher density of users, or both (Jensen et al. 2017).

Traffic Safety and Infrastructure

Women are more sensitive to traffic safety concerns than men, particularly for bicycling (Garrard and Handy 2012). Countries with high-quality bicycle infrastructure networks have nearly equal numbers of male and female bicyclists, yet countries without this infrastructure have two to three times more male bicyclists than female bicyclists (Garrard and Handy 2012). Similar gendered patterns in cycling behavior, attitudes, and access to high-quality infrastructure exist at the local and neighborhood scales, which suggests that investment in high-quality bike infrastructure projects is a matter of gender equity (Akar et al. 2013).

Our survey of research on pedestrian safety found mixed evidence on whether women and men have different perceptions of pedestrian safety or different injury risk. The literature did confirm that walking is an important travel mode for women and that women tend to walk more than men until they reach older ages, implying that women have more exposure to hazardous (or protective) pedestrian spaces (Pollard and Wagnild 2016; Loukaitou-Sideris 2006). Therefore, the efforts of Complete Streets to improve cyclist and pedestrian safety serve to benefit gender equity in transportation.

Urban Form

The gender equity outcomes of street-level multimodal infrastructure investments may be contingent on land use and transportation patterns at a regional scale. The regional patterns in residential racial segregation, gentrification, and transportation investments would also be interrelated with gender equity.

The benefits of multimodal transportation investments for both men and women tend to be maximized in higher density places where people travel relatively short distances to meet their daily needs (Lo and Houston 2018). If one lives in an auto-oriented community and has a disproportionate amount of care-related travel, then relying on cars is likely to be a practical, yet costly, necessity. The benefits of pedestrian, cycling, and transit investments of Complete Streets projects may be lower and more indirect for people who depend solely on cars (McLaren and Parusel 2015). In a lower density context, caregivers and nondrivers would gain additional accessibility benefits if multimodal streets and transit service expansion were complemented with regional land use and housing policies that result in compact settlement patterns (Boarnet and Hsu 2015).

Intersectional Considerations

Even in compact environments, the gender equity outcomes of multimodal infrastructure investment differentially reflect socioeconomic, racial, and ethnic patterns within a single gender population, namely women and nonbinary people for this study. In a study on bus rapid transit expansion and Complete Streets improvements in Mexico City, Chang et al. (2017) found that women with lower education experienced disproportionately larger increases in walking for transport and recreation and that the subset of working women with lower education also shifted their travel mode away from cars (from 19% to 4%). The study could not determine if these were positive or negative changes in the welfare of women who walked more and drove less because the study design emphasized the effect of the infrastructure, not the larger set of tradeoffs that travelers make such as time use or personal security.

Plans, Policies, and Implementation

Gender mainstreaming projects related to transportation have led the way in applying Complete Streets concepts (Wittbom 2011). European examples, such as the Mariahilf district in Vienna, highlight how multimodal transportation investments directly follow from—and may require

support from—gender-aware policy processes and methodologies. A second example elevates the role of participatory planning. In Barcelona, Col·lectiu Punt 6 has designed a participatory planning process to connect gender, urban design, and walkability across the spheres of everyday life, which include production, reproduction, personal identity, and political action (Ciocoletto 2016). A participatory planning process that includes diverse voices provides an even fuller picture of the heterogeneity within the spheres of everyday life.

Beyond these examples of gender-aware physical planning in Europe, the literature indicates the need for policies that prioritize women’s mobility patterns (Maciejewska and Miralles-Guasch 2019). For instance, adjusting school schedules to reduce constraints on women’s employment (Craig and van Tienoven 2019) and improving women’s access to emerging, flexible modes such as ridesharing and ride-hailing, can facilitate women’s participation in work and other activities (Singh 2019). These complementary policies are apt actions for a gender-aware Complete Streets agenda and expand its focus to include newer travel modes as well as new collaborations across sectors such as health care, human services, education, technology, and energy.

Complete Streets Should Expand Engagement with the Social Norms of Public Space

Our review identified a major gap between the scope of Complete Streets practice and the literature findings. The literature says that the experience of travel, as well as the outcomes of the transportation system, are profoundly influenced by social and cultural gender norms, perceptions of streets as public spaces, harassment and security, the social spaces of streets, the social spaces inside vehicles, and intersectional perspectives beyond age and ability. If existing Complete Streets policies and their implementation incorporated more sophisticated knowledge of these social factors, beyond infrastructure, it could more directly facilitate gender equity in transportation. This section presents empirical information, gender concepts, and regional cases, focusing on the cluster of six social topics in Table 2 that are underrepresented in the current Complete Streets agenda.

Subjective Experiences of Streets as Public Spaces

When cisgender women, transgender, and nonbinary travelers write about public space, their analysis often includes an examination of the social and psychological spaces in which one experiences social norms about appropriate gender behavior (in Figure 2, this would be Level 1 and Level 2). These authors reflect on their subjective sense of self and the consequences of resisting gender norms in public spaces such as streets or transit vehicles (Doan 2010). Farrow (2018), a queer traveler in the United States, described transgressing cisgender and heterosexual

norms in ordinary places such as public transit. These transgressions forced them to consider their appearance, which often made them feel vulnerable or confident, depending on the situation. The interaction between one's inner life and experience of public space ultimately prompted them to "play" with their gender presentation in public space, usually by modifying their clothing, posture, or facial hair, sometimes to fit gender norms, and sometimes to resist these norms. Thus, traveling in public space can also be a reflective inner journey through spaces of gender identity. For researchers in transportation and urban design, this is a topic that warrants further study.

The interaction between transportation, public space, and the subjective sense of self is a recurring pattern in the literature across regions. Guggenheim and Taubman Ben-Ari (2014) studied three ultra-orthodox communities in Israel, all with strict social bans on women's driving. Interviews with 13 ultraorthodox women who received special exceptions to drive, despite the ban, documented how they responded to driving. In this religious context, the drivers felt uncomfortable, exposed, and immodest. They did not feel immodest because of their driving skills or travel times, but because they sensed a conflict with their gender identity in the context of their communities and religious beliefs. Hence, traveling in public space can have negative, painful normative consequences, which, despite being a private injury, transportation planners should acknowledge. In fact, during the early period of motorization, traffic injury was considered a private problem resulting from a person's poor driving behavior; it was not treated as a public problem until professional norms acknowledged the multilevel interaction between individuals, environments, and system designers (McAndrews 2013).

These two examples foreground how people can experience gender as a function of traveling in public space. Further, these experiences suggest practical ways of assessing the inclusivity of streets, public transit vehicles, and other parts of the transportation system. A transportation system would be considered inclusive (or not) from the perspective of one's subjective experience of their gender, including unstable gender identity. Inclusive spaces are not necessarily copacetic or conflict-free. We would expect different evaluations of inclusion within and across people, as well as difficulty generalizing inclusion within the science-based policy system that governs streets. This difficulty, however, demonstrates that the role of subjectivity in Complete Streets is a critical and fertile arena for further examination and action through social science and humanities fields, the arts, creative design, placemaking, historic preservation, oral history, activism, and public humanities approaches to public engagement in transportation policy, planning, and urban design. These arenas offer precedents for planners to work with subjectivity, collective action, and public space. This indeed would be a massive yet necessary shift from traditional civil engineering approaches to local roads in order to fully address equity in these spaces.

Interpersonal Exchanges in the Transportation System

The literature on gender and multimodal transportation calls attention to the role of interpersonal exchanges that reinforce or sometimes challenge social norms around women's travel. These exchanges are not currently acknowledged in the Complete Streets framework, which focuses on infrastructure. They are, however, part of Complete Streets practice, usually in the form of family-focused cycling or walking events.

Based on the literature on gender and transportation, these events should be considered a potential mechanism to advance gender equity and social inclusion. For instance, family members or other close relationships have a strong influence on travel behavior. In her study about women and public space in Recife, Siqueira (2016) explained that her grandmother routinely ended their visits together with the same statement: "This is no time to be out in the street." She complied with her grandmother's wishes out of respect, though she did not necessarily share her grandmother's concerns about walking alone at night (Siqueira 2016). Nonetheless, we often honor and reinforce our social relationships through travel behavior. This is one mechanism through which "perceived fears and social norms circumscribe women's travel times to daylight hours and discourage non-motorized travel" (Song et al. 2018, 148). Siqueira's grandmother may be justified in her concerns, and, objectively, it may be less safe for women to travel alone at night in Recife. Yet women and gender minorities not only have the burden of circumscribed mobility and being targets of violence, but they are also called on by society—through personal relationships that maintain gendered ideologies of fear—to adjust their behavior, activities, and self-expression (i.e., Level 1) instead of looking upstream (i.e., to the social norms in Level 4) to prevent gender violence in the first place. Complete Streets events could be designed to correct these stereotypes and norms.

Another type of interpersonal exchange is outright harassment by strangers who intend to enforce misogynist norms of appropriate gendered behavior (Bhattacharyya 2016). Depending on one's regional and cultural context, certain travel modes (e.g., cycling, public transit) may be more likely to provoke harassment because of gender stereotypes and exposure, but often it is the simple presence of a woman or gender minority in public space that leads to being attacked. Again, individual travelers shoulder the impossible trade-off of either not participating in public life or traveling with a sensation of physical vulnerability. The prevalence of gender violence in streets and public spaces prompts female, transgender, and gender nonbinary travelers to manage their physical appearance, carefully select their route, carry a type of defense, text a friend when they get home or take other protective actions (Heim LaFrombois 2019; Song et al. 2018).

Complete Streets should take note that certain interpersonal exchanges can increase one's sense of security in public space, especially by seeing others of the same social group. Johnson and Miles (2014) interviewed nine observant Muslim Arab women who wore Islamic headscarves and who either lived in or frequently visited Bay Ridge in Brooklyn, NY. In addition to the physical design and land use aspects of walkability, these study participants explained that the "presence of substantial numbers of women wearing the Islamic headscarf...made them feel at ease and included in places that were otherwise foreign to them" (Johnson and Miles 2014, 1903). Moreover, the participants felt that their own presence in public space challenged negative stereotypes of Muslim women. This example teaches us that gender equity and inclusion within a Complete Streets framework could arise through interpersonal relationships and encounters, especially when they are supported by safe and walkable streets. Without these interpersonal relationships and encounters, the interviewees would not have seen one another and consequently felt a sense of belonging. In fact, these social encounters are not superfluous to streets and transportation, they are a critical part of our street that we should not oversimplify in design.

Institutionalized Gender Norms

Gendered social and cultural norms (Level 4 in Figure 2) influence decision-making and policies that shape transportation infrastructure and public spaces (level 3 in Figure 2). For instance, Ward (2000) reflected on her identity as African American, a woman, a traveler, an academic researcher, a policymaker, and a practitioner to emphasize the value of recognizing the intersections of one's different identities to actively resist discrimination. Ward had the professional status and influence to advocate for women, African Americans, and low-income transit riders in her work, but she faced tokenism and racism in her profession. "The conflicts arise when I assert myself as a human being...I am allowed to do research [with the expectation] that I do research that is of interest to white males and representative of their perspectives" (Ward 2000, 23). The implication for Complete Streets is that an inclusive transportation system extends to the transportation workforce through the professional norms and processes of system designers who create policies, design standards, and incentive structures (CIVITAS 2014).

Social and cultural norms that operate at Level 4 in Figure 2 establish the setting in which policymakers decide to invest in multimodal transportation infrastructure. Research has shown that countries that invest in bicycling infrastructure tend to have higher gender equality, measured with the Gender Equality Index (comprising indicators of gender equality in work, financial resources, education, time, power, health, violence, and intersecting identity factors; Prati 2018). Another example also shows the influence of national (or regional) gender norms, transportation systems,

and globalization. In a study of the metro system in Delhi, interviewees told the researchers that men were more respectful toward women in the metro (Level 2) than other transit systems in the city because the metro was specifically constructed based on Western ideas of modernity, which included gender equity (Level 4; Gopal and Shin 2019). While it is well-known that transit system design can affect gender equity, this literature tells us that Complete Streets will need to develop a broad cultural awareness of gender norms in society, at multiple scales, not only their function in the transportation system.

Anti-violence Responses for Transportation

The Complete Streets movement has hardly engaged with violence and harassment prevention (Level 2) yet the fear of gender-based violence—including harassment, assault, and rape—underlies much of the discussion of social norms in public space. The voices in this literature include transgender, gender nonbinary, men, and women travelers from all over the world (Soto Villagran 2017; Bhattacharyya 2016; Robertson 2016). Numerous articles document how travelers experience such fear, the cost it imposes on their lives, specific interpersonal defenses they have developed in reaction to pervasive violence, as well as institutional-level design and policy interventions to prevent it.

Rather than recapitulate this literature, which was recently reviewed by Ding et al. (2020), we consider how Complete Streets may respond. The main categories of anti-violence responses in the transportation sector include (1) design (e.g. lighting, maintenance, and transit station area configurations); (2) policing (e.g. programs that place police in transit environments); (3) technology (e.g. CCTV, real-time transit information, and smartphone-based reporting); (4) policy (e.g. women-only transit schemes, security audits by women, involving women’s voices in the planning process, and anti-harassment criminal justice measures); and (5) education (e.g. workshops, signage, and grassroots community action) (Ding et al. 2020; Rivadeneyra et al. 2015; Loukaitou-Sideris 2010).

Existing anti-violence strategies are not necessarily universally inclusive. In the context of LGBTQ communities in Toronto, Robertson (2016) notes some limitations of existing violence prevention strategies and recommends new practices. First, travelers often hesitate to report violence because the police notoriously doubt the validity of their experience and ultimately humiliate them for reporting. Citing larger patterns of racial bias in law enforcement, research participants in Toronto explained that reporting should be independent of law enforcement and that public transit agencies should have required sensitivity training. LGBTQ community organizations in Toronto also

recommended: “dismantling, disarming, and simply creating a better relationship with the police” to create more inclusive streets as public spaces (Robertson 2016, 87).

Activists and scholars have criticized the reliance on law enforcement to respond to gender violence as a mechanism of racial injustice. In practice, racialized laws and law enforcement disproportionately protect heterosexual, cisgender white women and disproportionately harm people of color, immigrants, transgender and gender nonbinary communities, as well as people with disabilities (Kim 2020). Examples from public space that are relevant for Complete Streets include the criminalization of panhandling, marijuana, sex work, and loitering and increased presence of law enforcement on streets, multiuse trails, bike paths, parks, open space, and other spaces associated with multimodal transportation (Robertson 2016; Loukaitou-Sideris 2010). These findings raise pressing questions about the appropriate and inappropriate use of law enforcement as well as alternatives to law enforcement in the transportation system. In practical application, Complete Streets planning must engage with diverse voices to understand what people perceive as a threat and likewise what they perceive as safe.

Conclusion and Implications for Practice

What does our review of the literature on gender and multimodal transportation recommend to the thousands of communities that are implementing Complete Streets policies? First, we learned that implementing existing Complete Streets policies may advance gender equity even without special attempts at gender awareness because women are more likely to walk, ride transit, and have concerns about cycling. We also realized the relevance of gender mainstreaming, which is a process through which policymakers and planners consider the different needs of men and women to bring gender awareness to every stage of planning, design, and implementation. When communities have applied gender mainstreaming to streets, corridors, or transportation networks, the process has resulted in programs that resemble Complete Streets.

Regarding gender mainstreaming, we found noteworthy examples from Vienna and Barcelona that validate its effectiveness. If communities desire gender awareness in their multimodal transportation planning, then public works departments, advisory committees, advocacy organizations, or consultants could apply principles of gender mainstreaming. Gender awareness can be integrated into existing the Complete Streets planning process by examining data disaggregated by gender, including gender-specific questions on surveys (e.g., caregiving, security), and including women and gender minorities in leadership and decision-making processes.

It is both appropriate and necessary to combine questions of gender with questions of race, ethnicity, religion, county of origin, and other identity factors that are as relevant to local communities as they are to transportation research. Complete Streets practitioners already rely on multi-sectoral partnerships and this approach can be expanded to include new partners who value lived experience in decision-making processes about streets as public spaces.

The effort to mainstream gender in Complete Streets can also serve as an opportunity to remove cisgender and heteronormative conventions in both the practice and study of transportation planning, policy, and design. As one of our review's articles proposed, "How do we queer gender in more spaces, particularly ordinary spaces like public transit..." (Farrow 2018)? This literature review illustrates both potential and challenges for moving beyond the gender binary in transportation and the need to increase awareness of queer and nonbinary concepts and perspectives. Our initial database search, for example, did not find the scholarship on queer, transgender, and nonbinary travelers. This is likely the result of the underrepresentation of queer urbanism scholarship in academic databases and because we searched this area with an expanded vocabulary and examination of bibliographies.

The literature shows the need for transformative structural and epistemic change, too, not only an additional equity "lens." We read the literature on gender, multimodal transportation, and public space as an exercise in listening to and believing the experiences of women and gender minorities. We found that a substantial proportion of evidence about gender equity in transportation is completely missing from the Complete Streets movement. Based on our analysis of this gap, we draw attention to three areas for future research and practice.

First, practitioners and researchers will need new tools, methods, instruments, and data to respond to the issues and questions raised in the literature, including the social norms of public space and violence prevention. Complete Streets plans reference social inclusion, sometimes disaggregate data by gender, and may use inclusive strategies for public engagement, yet they lack interventions designed to foster social inclusion or to prevent harassment (McCann and Rynne 2010). Researchers and practitioners could unite to develop respectful and evidence-based planning methods and tools that elevate gender in multimodal transportation. These may include questions for surveys, model policy language, and collaborative forms of public engagement, to name a few. In tandem, we must expand what counts as data, as well as the methods to create it, to increase the legitimacy of subjective experience and perceptions of public space.

Second, practitioners and researchers need to conceptualize streets as public spaces that are open systems of reciprocal relationships. Thus, achieving gender equity in transportation requires interventions in the social environment of streets. While transportation and public works departments do not typically develop anti-violence programs or supportive peer groups to complement the Complete Streets infrastructure, they should develop capacity in these areas and partner with other sectors that can lead the effort. A parallel example, drawn from urban design that empowers older adults, illustrates the dilemma: “loneliness cannot be solved with accessible ramps” (Kiyota 2017). Complete Streets faces a similar challenge of influencing underlying social phenomena through physical design. It is necessary to build sidewalks where women typically walk, but sidewalks will not necessarily make it an inclusive street, which is the underlying desired outcome of Complete Streets. Again, the subjective experience of travelers is a key source of insight about social inclusion in public space and Complete Streets can develop methods and capacity for utilizing this knowledge.

Through this review, we encountered several other examples of social-ecological interventions that can potentially expand the scope of Complete Streets research, practice, and policy to include the social realm. Examples include women’s walking groups sponsored by community health departments, public art, safe routes to school programs, community-based safety and security programs, feminist bicycle advocacy, and professional networks in transportation that specifically support historically underrepresented groups. Transportation professionals should see these interventions as just a starting point to advance gender inclusion in multimodal travel and placemaking. Evidence from the research tells us that multilevel interventions that combine sidewalks (i.e., Level 3 infrastructure) with supportive peer groups (i.e., Level 2 interpersonal exchange) can result in sustained, positive changes in walking behavior (Lee et al., 2012). Further, Complete Streets implementation could be more open to involving public health practitioners, educators, social workers, and other partners to prevent gender-based harassment.

Third, although practitioners could advance gender equity by working at smaller scales, their work would have a wider transformative effect as part of the larger transportation policy system. Beyond the domain of Complete Streets, this transformative practice needs to reach upstream mechanisms of transportation statutes, appropriations, finance, and project prioritization. Too often mainstream transportation policy maximizes mobility for middle-class commuters while investments for nondrivers, caregivers, and racial and economic minority groups remain piecemeal. This leaves practitioners—for example, those who focus on transportation disadvantages—to rely on underfunded cross-sector collaborations to implement critical transportation “alternatives.” The unmet demand for equitable mobility requires enabling policies, people of all genders in leadership, and changing broader social expectations. At the same time, novel policy change needs

complementary implementation through practical programs and designs, which is an ideal role for Complete Streets.

We know that planners, advocates, and public works departments face resistance when they try to convert auto-oriented streets into multimodal public spaces. Implementing a Complete Streets policy can take decades and demand hefty costs while actors reorganize themselves to dismantle traditional street design standards and replace them with new ones that reflect multimodal priorities. From start to finish, negotiating a new way to govern the social and technological order of streets requires hundreds of practical and discursive changes that are often too subtle to celebrate. Within this context, Complete Streets practitioners may interpret a focus on gender equity as burdensome, especially if they have already broadened the scope of Complete Streets to include race, ethnicity, and socioeconomic status. Such a response, or any other means of resistance, however, will only continue to halt racial justice, or justice for anyone else, in transportation.

The impulse of Complete Streets to create equity between travel modes prompts a fundamental question: what would it take to create full multimodal equity—streets that are safe for both all types of transportation and the varied subjective—and often shared—experiences of travelers? As equality by travel mode does not translate to equality across people, Complete Streets’ greatest potential is to resist “intersecting forms of oppression such as sexism, heterosexism, racism, ableism, and classism” through interventions in public space (Lubitow et al. 2017). Advancing gender equity will not necessarily be comfortable; it requires a collective push to create Complete Streets that are truly inclusive and to hold public systems accountable for wide-scale and long-term change. If Complete Streets utilizes an intersectional feminist framework, it can help achieve this resistance by recognizing complicated and fluid identities of travelers, adopting a relational approach to policymaking instead of individualism, and valuing the embodied experiences of road users who can attest to feeling included in public space.

Chapter IV: Review of Literature on Gender and Emerging Travel Modes

We conducted a comprehensive review to understand gender inequity in emerging travel modes, which include bike sharing, e-scooter sharing, carsharing, ride-sourcing/TNC.

Bike Sharing

Bike sharing seeks to expand access to cycling without having to own a bicycle (Pal & Zhang, 2017). After examining bike sharing literature, we found significant gender differences and inequalities in bicycle sharing behaviors and preferences. The majority of bike-sharing users are men (Pooley & Turnbull 1999, Dickinson et al. 2003, National Academies of Sciences Engineering and Medicine 2005, Beecham et al. 2013, Goodman & Cheshire 2014, Faghih-Imani & Eluru 2015, Gavin et al. 2016, Han et al. 2017, Kaviti et al. 2019, Hirsch et al. 2019, Morgan 2019, Nickkar, et al. 2019, Wang & Akar 2019, Mateo-Babiano et al. 2020). In fact, male users of bike sharing systems are more likely to be educated young men (Pooley & Turnbull 1999, Dickenson et al. 2003, Goodman & Cheshire 2014, Gavin et al. 2016, Han et al. 2017, Wang & Akar 2019, Hirsch et al. 2019). Men were also shown to use bike sharing more frequently than women (Dickinson et al. 2003, Goodman & Cheshire 2014, Guo et al. 2017, Barbour et al. 2019, Hirsch et al. 2019, Morgan 2019, Rérat, 2020).

Socio-economic and socio-demographic factors play a role in bike sharing usage by gender. Women in a higher tax bracket were more comfortable with the idea of bike-sharing (Chidambaram & Sceiner, 2019). Geographical location influenced bike sharing too; women that lived closer to a bike-sharing site were more likely to ride a bicycle from a shared system than women who lived farther away (Goodman & Cheshire 2014, Wang & Akar 2019). In London, women and lower-income communities were less likely than men and higher-income communities to use a bike sharing program (Ahillen et al., 2015). Gavin et al. (2016) infers that marketing could explain why minority populations are not utilizing the bike sharing programs and suggested that the use of marketing to increase bike sharing programs usage could be more effective, if it were directed to the intended audience (Gavin et al., 2016).

An analysis of Oslo's bike share trip records for 2016 and 2017 (2.1 million trips; 36,230 unique users) showed that the system provided inadequate access to women and female-dominated employment centers compare to men and male-dominated employment centers (Böcker et al.,

2020). The bike sharing rental restrictions are not well suited to women's preferences, such as the rental duration times and limited dock parking (Böcker et al., 2020). According to a study conducted in southern Tampa using Cost Bike Share System data, bike sharing accessibility of males is better than the population mean by 3.7% (Chen et al., 2019). Males tend to react more positively to bicycle-sharing than females; therefore, bicycle-sharing programs will not be as effective for organizations employing a large proportion of females (Gavin et al., 2016). The gender gap in active transportation has been persisted for decades and supported by bike sharing data (Morgan, 2019). Factors contributing to this gender gap include gender division of household work, the gender gap in wages, and enduring sexual harassment, assault, and fear in public spaces (Blumenberg et al., 2018).

Based on Chicago's Divvy Bike system data, females made longer bike sharing trips in duration and distance than men (Faghih-Imani & Eluru 2015, Zhou & Chen 2015). Trip chain travel patterns for bike share are consistent with the broader literature on women's travel that finds that women tend to perform more trips with four primary purposes: commuting to work, grocery shopping, meetings, or picking up children (National Academies of Sciences Engineering and Medicine 2005, Beecham et al. 2013, Kawgan-Kagan 2015, Ricci 2015, Zhao et al. 2015, Alonso-Almeida 2019, Cerdà-Benito 2019, McGuckin 2019, Blumenberg et al. 2018, Kawgan-Kagan & Popp 2018, Ng & Acker 2018, Fortunati 2019, Nickkar et al. 2019, Böcker et al. 2020).

E-scooter Sharing

E-scooter sharing systems have quickly become a popular transportation mode since their emergence in 2017. The literature on e-scooter sharing also shows significant gender differences and inequalities in e-scooter sharing systems' behaviors and preferences. The e-scooter sharing data for the United show that survey respondents in various cities tend to be men (Table 6 and Figure 3). Based on these surveys, the literature shows that the majority of e-scooter sharing users are men (Hart & Bogenberger 2018, Baltimore City Department of Transportation [BCDOT] 2019, City of Santa Monica 2019, Dill 2019, San Francisco Municipal Transportation Agency [SFMTA] 2019, Jiao & Bai 2020, Mobility Lab 2019, U.S. Fed News [USA] 2019, Glenn et al. 2020, Yang et al. 2020). Alexandria, Virginia was the exception, where there were more female survey respondents than male respondents (City of Alexandria, 2019).

The Portland Bureau of Transportation's e-scooter pilot program conducted a survey of 4,532 survey respondents (Portland Bureau of Transportation (PBOT) 2018, Dill 2019, U.S. Fed News [USA] 2019). Based on survey data, women are using e-scooters less frequently than men

(Baltimore City Department of Transportation [BCDOT] 2019, Dill 2019, San Francisco Municipal Transportation Agency [SFMTA] 2019). Dill suggests men are more likely to continue using e-scooters on a day-to-day basis compared to women, who are occasional riders (Dill, 2019). The results indicated that men use e-scooter sharing to avoid encountering traffic on their commute to work and because it would increase their mobility speed (Dill, 2019). According to Glenn et al., men were also more likely to use e-scooter sharing to avoid parking hassles than women (Glenn et al., 2020). Men also use e-scooter sharing to travel to school more than women (Glenn et al., 2020). In contrast, women were more likely to use e-scooters for recreational purposes (U.S. Fed News [USA] 2019, Dill 2019, Glenn et al. 2020). However, Donald & Husiuk indicates that BCDOT's recent data shows that users are increasingly using e-scooter sharing for essential trips, such as grocery stores, hospitals, and parks (Donald & Husiuk, 2020).

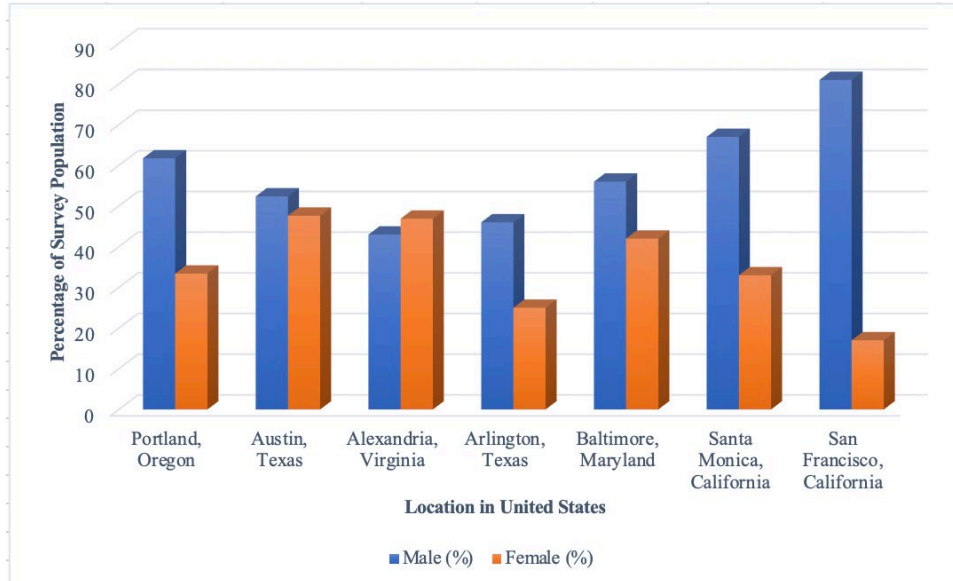
Table 6. E-Scooter Survey Response Rates by Gender, Selected U.S. Surveys

E- Scooter Gender of Respondents				
Location	Male (%)	Female (%)	Majority	Source
Portland, Oregon	61.74	33.4	Male	(Portland Bureau of Transportation [PBOT], 2018).
Austin, Texas	52.381	47.619	Male	(Jiao & Bai, 2020).
Alexandria, Virginia	42.99	46.89	Female	(City of Alexandria, 2019).
Arlington, Texas	46	25	Male	(Mobility Lab, 2019).
Baltimore, Maryland	56	42	Male	(Baltimore City Department of Transportation [BCDOT], 2019).
Santa Monica, California	67	33	Male	(City of Santa Monica, 2019).
San Francisco, California	81	17	Male	(San Francisco Municipal Transportation Agency [SFMTA], 2019).

According to a study by Populus of 7,000 survey respondents in 10 cities between May and July of 2018, women adopt e-scooters more quickly than bike sharing (Marshall 2018, Morgan 2019). Based on survey data, both men and women are positive about e-scooter sharing and said it would be "extremely likely" to recommend them to a friend (Dill, 2019). Marshall suggests women have positive perceptions of e-scooter sharing since e-scooters are easier to ride in restrictive clothing, commonly worn by women (Marshall, 2018). These restrictive clothing may include dresses, skirts, and heels, clothing that some women wear to work (Marshall, 2018). Marshall also implies

that women who do not have access to showers at work might appreciate the very little physical exertion e-scooters require (Marshall, 2018).

Figure 3. Comparison of Male and Female E-Scooter Survey Response Rates



In Riyadh, Saudi Arabia, a study was conducted in April 2020 to gain insights into e-scooter systems' perception (Almanaa et al., 2021). The outcomes of logistic regression models indicate gender, age, and use of ride-hailing services play a significant role in respondents' willingness to use e-scooter sharing systems (Almanaa et al., 2021). The results indicated males were twice as likely to agree to the willingness to use the e-scooter sharing system if available (Almanaa et al., 2021). Almanaa et al. suggest the low potential female users may be concerning the poor representation of females in the workforce and hypothesize this would be changed if there was an increase in female's participation in the workforce (Almanaa et al., 2021). Almanaa et al. suggest that e-scooter sharing companies could encourage potential users to become frequent users by providing incentives for using e-scooter sharing, such as offering discounts for first-time users. These incentives may attract female users to participate in e-scooter sharing since females are more inclined to use e-scooters due to price. The binary logistic regression model outcomes indicate the odds of females using e-scooters due to price are 52% higher than the odd of men using e-scooters due to cost. The results show that women are more likely to use e-scooter sharing in the future (Almanaa et al., 2021). The results also indicated that ride-hailing users have used or are willing to use e-scooters if available (Almanaa et al., 2021).

According to Almannaa et al., both e-scooter users and non-e-scooter users indicated insufficient infrastructure and safety concerns were the leading obstacles facing e-scooter sharing usage (Almannaa et al., 2021). Sufficient infrastructure is crucial to enable the integration of e-scooter sharing systems effectively into urban mobility and enable safe and efficient commutes for users in the proximity of motorized vehicles and pedestrians (Almannaa et al., 2021).

It appears that men are more likely than women to get involved in an e-scooter crash (San Francisco Municipal Transportation Agency [SFMTA] 2019, Baltimore City Department of Transportation [BCDOT] 2020, Yang et al. 2020). According to the Baltimore City Department of Transportation [BCDOT], respondents who reported being involved in an e-scooter crash indicated the most commonly cited cause of the crash was the road or sidewalk condition (Baltimore City Department of Transportation [BCDOT], 2020).

Based on Portland survey data, women are more likely to avoid on-street riding than men due to safety perceptions (Dill 2019, Glenn et al. 2020). Women's primary concern while e-scooter sharing is the perceived road traffic safety concerns (Dill 2019, Donald & Husiuk 2020). Safety concerns include not only the interaction of e-scooters and motorized vehicles but also the interaction of scooters and pedestrians (Donald, 2020). According to Dill, 54% of women indicated having a safe place to ride e-scooters would increase their use compared to 46% of men (Dill, 2019). Dill suggests men and women equally prefer riding their scooters if there was a dedicated bike lane as it gives them a better sense of security (Dill 2019). Marshall suggests more dedicated cycling and scooting infrastructure including, protected bike lanes, dedicated parking, and wider sidewalks (Marshall, 2018). Based on survey data, 75% of Provo, Utah users also suggested additional and improved bike lanes would allow them to ride on the street with ease (Glenn et al., 2020).

Carsharing

After examining carsharing literature, there exists significant gender differences and inequalities in carsharing systems' behaviors and preferences. The majority of carsharing users are men (National Academies of Sciences Engineering and Medicine 2005, Kawgan-Kagan 2015, De Luca & Di Pace 2015, Kawgan-Kagan & Popp 2018, Shaheen et al. 2018, Alonso-Almeida 2019, Fortunati 2019, Ströhle et al. 2019, Zhou et al. 2020).

Socio-economic and socio-demographic variables also play a role in carsharing usage between gender (Kawgan-Kagan 2015, De Luca & Di Pace 2015, Alonso-Almeida 2019). In the United

States, most users were men; this can be due to carsharing being predominant in urban areas that target users seeking a more convenient transportation method (Shaheen et al., 2018). A survey data conducted in the San Francisco and east bay area indicate the market of carsharing was tailored to the household location of users, meaning that users that lived close to the POD locations were more inclined to use it (Cervero et al., 2007). Peer-to-peer carsharing users generally spend less money on transportation; however, the data shows that carsharing users generally had a higher income than the average (Shaheen et al., 2018). Women often earn less money than men, affecting their carsharing usage (Kawgan-Kagan 2015, Alonso-Almeida 2019).

A survey was conducted in Norway with 2,414 resident respondents, consisting of only 7% carsharing users and 93% non-carsharing users (Hjorteset & Böcker, 2020). Gender prompts a substantial direct effect on the intention to participate in car sharing (Hjorteset & Böcker, 2020). Based on survey data, it concluded that men have a stronger intention to participate in car sharing than women (Hjorteset & Böcker, 2020). Women are more interested in car sharing than men; however, women were more unlikely to enroll and become a carsharing member than men (Hjorteset & Böcker, 2020). According to Hjorteset & Böcker, there was an indirect positive effect that suggests men carshare due to financial concerns (Hjorteset & Böcker, 2020). Men were more often to select carsharing for their last trip due to the cost and preference of carsharing than other modes (Martin & Shaheen, 2011). Men were more likely to join carsharing due to their enjoyment of the overall philosophy than women (Burkhardt et al., 2006). In contrast, women are more likely to participate if it provided a financial or personal benefit (Alonso-Almeida, 2019). It was also shown that women were more likely to join in carsharing if their employer paid the cost (Burkhardt et al., 2006). Employers are encouraged to create car-sharing workplace schemes; however, these may not appeal to women who require making trip-chains to perform their family responsibilities (National Academies of Sciences, Engineering, and Medicine, 2005).

Women use carsharing as an additional part of urban mobility (Kawgan-Kagan, 2015). Women tend to prefer public transportation, such as bus or train, over private transportation (Ng et al., 2018). Women also prefer hiring a taxi over driving a car since they have a much more complicated travel pattern (Ng et al., 2018). If a better sharing alternative were to be present, women could give up driving altogether (Ng et al., 2018). According to McGuckin, women make more trips than men yet drive fewer miles than men (Hanson 2010, McGuckin 2019). Women often had shorter and more carsharing trips than men with multiple stops (Millard-Ball 2005, Kawgan-Kagan 2015, Kawgan-Kagan & Popp 2018, Alonso-Almeida 2019, Fortunati 2019, McGuckin 2019). Women tend to perform more trips with multiple stops, “trip chains”; trips with four primary purposes: commuting to work, grocery shopping, meetings, or picking up children; than men due to their obligation to household and childcare errands (National Academies of Sciences Engineering and

Medicine 2005, Beecham et al. 2013, Kawgan-Kagan 2015, Ricci 2015, Zhao et al. 2015, Alonso-Almeida 2019, Cerdà-Benito 2019, McGuckin 2019, Blumenberg et al. 2018, Kawgan-Kagan & Popp 2018, Ng & Acker 2018, Fortunati 2019, Nickkar et al. 2019, Böcker et al. 2020). The literature indicated that parenthood and the household's resulting tasks and responsibilities could influence their transportation mode choice (Uteng et al., 2020). Fortunati specifies that women tend to use free-floating car-sharing less than men due to their obligations of household and childcare duties (Fortunati, 2019). Women have gender roles such as managing the home and childcare, limiting their access to resources such as cars, available time, and mobility (Sovacool et al., 2019). Parenthood and the resulting tasks make using free-floating carsharing complex while parenting children (Kawgan-Kagan 2015, Kawgan-Kagan & Popp 2018, Fortunati, 2019, Uteng et al. 2020). Free-floating carshare is discouraging for women accompanying children due to the scarcity of cars, carrying and installing car seats for children, not storing belongings in the car, and cleaning the vehicle after every trip. For example, suppose the available cars were located more than one-third of a mile away. In that case, women are inconvenienced by carrying their children, their child's belongings, and child seats to the car, then needing to install and uninstall the car seat(s) and clean the car every time they carshare (Fortunati, 2019).

Concerns regarding automobility's environmental impact have been a significant motivation for individuals to participate in carsharing (Hjorteset & Böcker, 2020). However, men are less environmentally conscious than women (Hjorteset & Böcker, 2020, Sovacool et al., 2019). Women are more concerned about sustainability issues than men (Kawgan-Kagan & Popp 2018, Alonso-Almeida 2019, Bansal et al. 2019). Women have higher environmentally friendly traffic behavior (Kawgan-Kagan, 2015). Their awareness of sustainability indicates that they are inclined to favor the sustainable benefits of carsharing. Encouraging car-sharing could positively impact both women from ethnic minority communities and young people, who heavily rely on others for rides (National Academies of Sciences, Engineering, and Medicine, 2005). Hjorteset & Böcker suggested targeting car-sharing marketing to women, implying that car-sharing is a better alternative to private vehicles (Hjorteset & Böcker, 2020). Hjorteset & Böcker found a positive correlation between carsharing membership and environmental consciousness, indicating that environmentally conscious people are more likely to be carsharing members (Hjorteset & Böcker, 2020). Hjorteset & Böcker indicates more environmentally conscious people are less likely to own a car, resulting in an increased likelihood to be carsharing members (Hjorteset & Böcker, 2020). Cervero et al. indicate membership of City Carsharing showed reduced vehicle ownership (Cervero et al., 2007). Li et al. suggested a need for effective policies that address women and fampool, carpool with almost 75% family members and commuters, needs (Li et al., 2007).

For peer-to-peer carsharing, women prefer to travel with familiar people, whereas men are more flexible (De Luca & Di Pace 2015, Alonso- Almeida 2019). Women prefer to be passengers and usually share the family car (De Luca & Di Pace, 2015). Women show lower confidence in car-related technical skills and driving skills, which can attribute to their overall mobility and road safety (Sadia et al., 2018). The availability of a trusted carsharing platform may reduce women's fear and insecurity of safety and increase carsharing usage (Kawgan-Kagan & Popp 2018, Alonso-Almeida 2019).

Ride-sourcing / Transportation Network Companies (TNC)

Based on the literature review involving transportation network companies, it was apparent that there was a significant difference when it came to the gender of both drivers and users.

Female drivers experience inequality within the workforce of transportation network companies (TNCs). Women account for approximately 10% as Uber drivers, 30% as Lyft drivers, and 40% as independent car drivers (Schoenbaum, 2016). Women are underrepresented in the labor force; this may be due to parental duties (Rérat, 2020). The sharing economy is also affected by informal segregation for women drivers (Schoenbaum, 2016). Drivers are often paid a premium during the nights and weekends; however, working during those times poses a safety concern for women drivers (Schoenbaum, 2016). In some instances, passengers are often intoxicated, thus leaving women drivers more vulnerable to safety hazards (Schoenbaum, 2016). As a result, they often opt out of the opportunity to gain capital during nighttime and weekend driving due to safety concerns (Schoenbaum, 2016). This creates an unwanted gender earnings gap among ride-sourcing drivers (Moody et al., 2019). According to Hu, educating women on how to join the job markets of transportation was deemed an effective way of eliminating most of these day-to-day issues (Hu, 2019). Hu suggests an active promotion of women entering the transportation workforce (Hu, 2019). Ng & Acker suggest ride-sourcing companies should hire and train women drivers (Ng & Acker, 2018). To increase the female workforce, Uber has pledged to hire more female drivers (Schoenbaum, 2016).

The majority of the ride-sourcing users consist of men (Rayle et al. 2016, McGrath 2017, Lahkar 2018, Moody et al. 2019). According to McGuckin, working parents were less than half as likely to commute via rideshare than employed singles within 30 days (McGuckin, 2019). Among that group, working mothers are less likely to use ride-hail services than working fathers and other groups; due to their maternity chores, unequal distribution of childcare tasks, the lack of equipment and limited safety features for their accompanying children, and the low-capacity cargo to suffice

their household tasks such as groceries (McGuckin, 2019). McGuckin suggests that society should aim for both women and men to be equal partners in both work and family life (McGuckin, 2019).

Many TNCs provide ride pooling options. Younger women passengers are more prone to ride pooling since they are more environmentally conscious (Bansal et al., 2019). However, men are less likely to ridepool than women in replacing active modes or public transportation (Lesteven & Samadzad, 2021). To spread ride pooling awareness, targeted marketing for carpooling's environmental benefits (Bansal et al., 2019). Bansal et al. suggest proposing automakers create tailor-made vehicles for pooling that include partitions to ensure that passengers feel safe (Bansal et al., 2019).

Chaudhry et al. indicate ride-sourcing services passengers are likely to encounter multiple potential risks (Chaudhry et al., 2018). In ride-sourcing and Transportation Network Companies (TNC), there are safety concerns for female drivers and passengers, having a rise in sexual assault complaints between passengers and drivers (Schoenbaum 2016, Su et al., 2019). A survey on public safety in transportation shows women tend to feel less safe than men (Chowdhury, 2019). For shared TNC rides, 58.7% of women felt uncomfortable traveling with someone they did not know compared to 45.40% of men, and 54.6% of women feel uncomfortable traveling with a driver they do not know compared to 37.6% of men (Capasso da Silva et al., 2019). The main concern for using transportation network companies such as Uber and Lyft are users' lack of perceived personal safety, such as sexual harassment complaints predominately from female passengers and drivers.

In a study based on 581 trips in Seattle via Uber, Lyft, and Flywheel and 839 trips in Boston, the ride-sourcing drivers took female passengers on farther and more expensive Boston trips. Females, as ride-sourcing passengers, were driven approximately 5% further than men by ride-sourcing drivers (Ge et al., 2016). The flirting and chatty conversation was prevalent among the female passengers' drivers (Ge et al., 2016). To combat this issue, ride-sourcing companies should propose fixed rates based on distance (Ge et al., 2016). Safety should be one of the most concerning issues for transportation policy makers and ride-sourcing service providers to address (Su et al., 2019).

A noteworthy reaction to sexual harassment was the conception and implementation of a different approach to ridesharing, called "pink transportation" (CITIVAS 2014, Hall-Geisler 2016, Hutson & Kruger 2019, Rafiq & McNally 2019). This form of transportation includes single-gender rail cars and women-only ridesharing companies. To combat street harassment, public policy in the United States should begin to restructure and reconfigure public spaces for more inclusivity

(Hutson & Krueger, 2019). Ride-sourcing companies can easily and efficiently implement and enforce regulations to alleviate users' perceived safety concerns using technology and GPS tracking (Ng & Acker, 2018).

Gender Inequality in the Context of Emerging Travel Modes

There exist significant gender inequalities in the context of emerging transportation modes, particularly in travel behaviors and preferences. Across all of these emerging transportation modes, it was evident the majority of users were men. The main concern for women's usage across all of these emerging transportation modes was safety. Safety concerns and safety perceptions can negatively impact female use. There is a significant concern for perceived road traffic safety, most evident in bike-sharing and e-scooter sharing systems. There is also a substantial concern for perceived personal safety, most apparent in ride-sourcing and transportation network companies (TNC) than carsharing services. Factors contributing to the gender gap include gender division of household work, the gender gap in wages, and enduring sexual harassment, assault, and fear in public spaces (Blumenberg et al., 2018).

Evident in all of these emerging transportation modes, parenthood and the household's resulting tasks and responsibility could influence the users' choice of transportation mode (Kawgan-Kagan 2015, Uteng et al. 2020). Women choose more flexible modes due to having multiple household tasks and activities (Ng & Acker, 2018). Women usually have various tasks and activities due to the gendered division of work within the household (Zhao et al. 2015, Blumenberg et al. 2018, Ng & Acker 2018, Cerdà-Benito 2019). Women tend to perform more trips with multiple stops, “trip chains”; trips with four primary purposes: commuting to work, grocery shopping, meetings, or picking up children; than men due to their obligation to household and childcare errands (National Academies of Sciences Engineering and Medicine 2005, Beecham et al. 2013, Kawgan-Kagan 2015, Ricci 2015, Zhao et al. 2015, Alonso-Almeida 2019, Cerdà-Benito 2019, McGuckin 2019, Blumenberg et al. 2018, Kawgan-Kagan & Popp 2018, Ng & Acker 2018, Fortunati 2019, Nickkar et al. 2019, Böcker et al. 2020). As a result of women having more household responsibilities than men, they are more likely to commute shorter distances (Kawgan-Kagan 2015, Kawgan-Kagan & Popp 2018, Ng & Acker 2018, Alonso-Almeida 2019).

Women are less prevalent in the labor force than men; this may be due to parental duties such as being held more accountable for household chores and spending more time with their children (Rérat, 2020). Due to this, they have more non-work-related trips (Ng & Acker 2018, Cerdà-Benito 2019). Mothers made the most care activities trips than fathers, whereas fathers take trips for

professional activities (Cerdà-Benito, 2019). Ng & Acker also showed that women travel at off-peak hours (Ng & Acker, 2018). McGuckin suggests that society should aim for both women and men to be equal partners in both work and family life (McGuckin, 2019).

Evident throughout all emerging transportation modes, physical improvements are needed to enhance the user experience. Since women having more household and childcare responsibilities than men, they are less likely to use these emerging transportation modes due to the lack of cargo capacity women need to perform their tasks, such as groceries and being accompanied by children (McGuckin 2019, Bieliński & Ważna 2020, Yang et al. 2020). It was also evident the lack of safe child equipment provided in these emerging transportation modes, such as car seats, discourages woman usage (Kawgan-Kagan & Popp 2018, McGuckin 2019, Alonso-Almeida 2019). Therefore, improvements to transportation modes, including increased cargo capacity, providing adequate equipment for children, and other road traffic and personal safety improvements integrated into the vehicles, are suggested.

Environmental factors may also play a role in women's mode preference. According to the literature, men are less environmentally conscious than women (Hjortset & Böcker, 2020, Sovacool et al., 2019). In comparison, women are more concerned about sustainability issues than men (Kawgan-Kagan & Popp 2018, Alonso- Almeida 2019, Bansal et al. 2019). Women also have higher environmentally friendly traffic behavior (Kawgan-Kagan, 2015). Targeted marketing of environmental benefits of emerging transportation modes such as carsharing to women may encourage women usage.

Of the National APA Session Survey respondents, 93% of respondents disagree with a culture of gender-conscious planning in their community. 99% of respondents disagree with land developers being responsive to the unique needs of women. It is evident there is a lack of gender-conscious planning in communities and land developers lacking responsiveness to women's unique needs (Appleyard et al., 2019). Women's needs are not being equally considered as men's needs and are not benefitting equally from policies and programs (Appleyard et al., 2019). Due to the gender inequalities present throughout all of these emerging transportation modes, gender-inclusive planning and design are suggested to alleviate gender inequality.

Applying Gender Concepts to Emerging Travel Modes

The mobility characteristics hypothesis assumes that ride-hailing is a gender-neutral travel mode that a traveler of any gender would choose because of its similarity to private cars and public

transit. Ride-hailing fits somewhere between private cars and public transit with respect to time efficiency, financial cost, route flexibility, and ride availability (Singh, 2019; Rayle et al., 2016; Hall et al., 2018). Rayle et al. (2016) found that ride-hailing tends to replace transit among non-car owners, supporting the claim that it can substitute for transit. Clewlow and Mishra (2017) reported that ride-hailing is associated with a reduced number of miles people drive personally as well as reduced public transit use, which would indicate that it could substitute for either cars or transit among travelers who have access to a car and who ride transit.

With respect to gender, the travel behavior literature indicates that driving is the primary travel mode choice of employed men with access to an automobile (Schwanen, 2011; Vance et al., 2005; Doyle and Taylor, 2000). Studies of gender and travel behavior also report that men are usually drivers of private cars whereas women tend to be passengers (Doyle & Taylor, 2000; Morency, 2007). If ride-hail is a good substitute for driving or being a passenger, then it could serve men or women. There is an argument that ride-hail would serve the subset of women who use public transit more often for shorter distance trips, though the specific patterns in transit ridership vary by a woman's income and ethnicity (Doyle & Taylor, 2000; Hanlon, 1996; Wachs, 2010).

Social norms shape women's labor force participation, household responsibilities, and economic status. With a growing number of women participating in the labor force, the number of licensed female drivers has increased tremendously (Blumenberg, 2016; Martin et al., 2016). Women also make more household serving trips than men (above and beyond their work trips) and the pressure on women's time is higher for women than for men (Hanson & Hanson, 1981; Kwan, 2000; McGuckin & Murakami, 1999; Noland & Thomas, 2007). The presence of children in the household is another key factor influencing women's travel behavior, as women's trip patterns are often child-related (Craig and van Tienoven, 2019; McDonald, 2005). Martin et al. (2016) noted that women are more willing to drive a private car because it offers flexibility for carrying out complex trip chaining. Women experience more economic disadvantages because of lower access to private cars, even though they have a higher demand for cars, especially among low-income households where people share cars among drivers (Blumenberg, 2016; Scheiner & Holz-Rau, 2012).

The gender norms hypothesis assumes that ride-hailing would reduce the mobility and access constraints that women face by increasing the convenience of household-oriented trips such as shopping, chauffeuring children, and other family errands, which are trip purposes that constitute a large part of women's travel because women are disproportionately care givers.

Ride-hailing could be an attractive travel mode and benefit women if it can help balance the travel demand associated with paid work and care work. Another possibility is that the flexibility of ride-hailing could be useful for people who trip chain and who otherwise would ride transit or walk (Boarnet & Hsu, 2015; Craig & van Tienoven, 2019; McGuckin & Murakami, 1999). Thus, ride-hailing's characteristics may be an appealing option for women who have relatively lower access to private cars.

Chapter V: Complete Streets and Gender Analysis Toolkits

Of all the existing gender analysis tools and policies identified in this search, only one evaluation framework mentions gender as an analysis measure. The AARP Evaluating Complete Streets Projects: A Guide for Practitioners (2015) lays out hundreds of metrics that can be used to analyze Complete Streets policies. The Guide recommends measuring most metrics by gender, along with other characteristics, such as race, age, income, and disability status.

Yellowstone County in Montana and Los Angeles County in California provide the most recent examples of gender analysis in the United States. The Los Angeles County Metropolitan Transportation Authority was the first transit agency in the United States to analyze gender-disaggregated data (Khanna and Podgers 2020). The Healthy by Design community coalition in Yellowstone County was even successful in adopting (and later revising with community input) a Complete Streets resolution that was informed by a gender lens (Keippel et al. 2016).

Case Study: Healthy By Design Community Coalition

Since 2001, the City of Billings in Yellowstone County, Montana had an alliance of hospital Chief Executive Officers and the Yellowstone County Health Department that set out to address community-wide issues. Following a community health needs assessment, the Healthy By Design community coalition was formed in 2005 to develop the partnerships necessary to improve health outcomes. The coalition completed a follow-up community health needs assessment in 2010 and identified barriers to physical activity that were specific to women. In this assessment, women reported limited physical activity as a result of “physical, mental, or emotional problems” (Keippel 2017, p. 524), women reported not being able to engage in leisure time physical activity, and women reported safety concerns that limited physical activity. Simultaneously, the coalition was granted funding from the U.S. Department of Health and Human Services Office on Women’s Health for needs assessment activities, as well as gender analysis and strategic planning. Focus groups were conducted that included a diverse sample representing a wide age range, multiple races and ethnicities, and multiple employment types. There was also a separate group for men.

Healthy By Design then took used results from the focus group to advocate for Complete Streets policy in Billings. They were able to share how women interact with the built environment in ways that differ from men’s interactions, largely because of safety concerns and limited connectivity between bike lanes and trails. The Healthy By Design coalition presented these findings across the city as the Complete Streets policy was being developed to ensure that gender-based needs were heard and accounted. These findings were presented to a wide array of stakeholders, including Billings Neighborhood Task Forces, the Chamber of Commerce, schools, and County Commissioners. As a result, the Billings City Council unanimously voted to include safety and consideration of all users in their Complete Streets policy. Many of the gender analysis metrics used in the coalition’s community health needs assessment were later included in Billings’ 2013 Complete Streets Benchmark Report (Keippel 2017).

It is important to note that much of the work in this area refers to gender analysis, yet only examines data according to male and female behavior patterns. Transgender, nonbinary and other gender identities are not widely included in these toolkits (Government of Canada 2018) and there is no guidance available on how to analyze policies beyond binary male and female categories. This may be partly explained by limited data availability for nonbinary gender classifications.

Key Findings from Existing Gender Analysis Tools

The review of existing gender analysis tools resulted in four main findings. First, gender analysis tools and recommendations differ based on the setting to which they are applied. For example, tools created for North America or Europe address gender in the context of other characteristics, such as age and religion. These tools work to examine how gender intersects with other aspects to influence the way people use public services. This is exemplified in the AARP Guide mentioned above. Tools developed for Asia and South America largely focus on accommodating for cultural norms that historically separated women from society or limited their social interaction or mobility. Both approaches are important for a Complete Streets policy in the United States given the diversity of cultural backgrounds in most major municipalities.

The second finding from the literature showed that gender analysis is only effective when accompanied by personnel training (Government of Canada 2016). Government employees and other stakeholders tasked with carrying out the analysis should be trained on the importance of gender analysis and what its findings mean.

Similarly, a third result of scanning the gender analysis tools was that policies from gender analysis techniques are only successful if they are enforceable. Toolkits from both Sweden and Canada highlight the importance of developing accompanying policies that regulate or otherwise enforce the new practices that come from a thorough gender analysis. Without this key component, the policy becomes benign and does not achieve its goals (Polk 2003, Government of Canada 2016).

Both Sweden and Canada have implemented policies and created agencies that allow their countries to enforce gender-based governance on a national level. The Sweden Gender Equality Agency was created in 2018 as the governmental body that guides the implementation of the nation's gender equality goals. The Agency is tasked with developing an ongoing analysis plan that evaluates interventions (Sweden Gender Equality Agency, 2018). In Canada, the Minister of Status of Women is mandated by the government to ensure that policies and regulations account for their effect on women. To adhere to this mandate, the Status of Women Canada and other

federal agencies in the country collaborate to identify barriers to gender-based policies, as well as complete assessments and audits of each government agency. The Auditor General of Canada developed a strategic plan that identified gaps in achieving gender-based analysis and sought an assessment of additional resources needed to carry out this analysis on a national scale (Government of Canada 2016).

The fourth main finding from reviewing existing gender analysis tools is that the national benchmarks for Complete Streets policies only recently included a gender component. Until 2019, the Smart Growth America and the National Complete Streets Coalition did not include gender as a factor that would be relevant to Complete Streets. In 2019, it included “gender identity” among the qualities that one would use to describe diverse users (Smart Growth America and National Complete Streets Coalition, 2019, 20). AARP also mentions examining gender when evaluating Complete Streets projects, though these suggestions do not affect how these projects are ranked and promoted.

Steps in Completing Gender Analysis

There are five main key steps in analyzing a policy with consideration of gender. These steps are designed to apply to services provided by a public agency as well as public policies. The five steps are:

1. Identify different transportation needs according to gender
2. Evaluate how current road infrastructure is used differently by men and women
3. Identify opportunities to maximize gender benefits and reduce barriers
4. Engage stakeholders to implement and enforce gender-based policies
5. Create continuous monitoring system

Identify Transportation Needs According to Gender

The first step across all existing tools is to collect data around transportation behaviors and disaggregate that data by gender. It is important to understand how men and women differ in their use of transportation so that policies can be developed that meet these different needs. The World Bank Group (2010) describes the following best practice in its guide on Mainstreaming Gender in Road Transport: gender analysis should identify gender differences in “travel activity patterns, particularly differences in relation to trip purpose, frequency and distance of travel, mode of transportation used, mobility constraints to access other sector services such as health, and

complexity of trip making” (10). These are key metrics that can be determined through travel diaries, focus groups, surveys, and other data collection means. It is important to gather data in a manner that allows it to be disaggregated by gender, but also by any other metric that is being considered for intersectional comparison (Government of Canada 2016).

Some differences between men and women travel behaviors are outlined in the previous section of this report; however, those were examined on a national scale. It is imperative to understand how these differences apply in the specific subject setting. There may be additional differences that are specific to the area under examination that do not exist nationally and vice versa.

It is important to collect both quantitative and qualitative data when identifying transportation needs. Quantitative data provides valuable information about where a person went and how they got there, while qualitative data can shed insight on the reasons for the person’s travel behavior. Travel decisions are often made based on a variety of factors and qualitative data can shed light on those factors in a way that is not captured in number of trips per day or travel mode selection (Garrett 2014).

Evaluate Differences in Current Road Infrastructure Uses

Men and women may use roads differently based on the physical and urban design characteristics of the road. Gender analysis should include an evaluation of how roads are designed based on the different barriers that men and women face in using them (Asian Development Bank 2013). Relevant data may include perceptions of street lighting, safety, and road quality, and how each of these perceptions affect men and women’s travel patterns.

Identify Opportunities to Maximize Gender Benefits and Reduce Barriers

The crux of gender analysis in transportation is identifying the main differences in how men and women travel, as well as the reasons for those differences. As the ACDI/VOCA Gender Analysis, Assessment, and Audit Toolkit (2012) explains, “gender analysis explores gender differences so policies, programs and projects can identify and meet the different needs of men and women” (2). Therefore, after collecting and disaggregating pertinent information, the gender analysis process then needs to identify the key differences between how men and women travel in the subject setting and determine ways to reduce barriers and maximize benefits. In rural Peru, this meant adjusting public transportation operating hours to accommodate women who worked longer hours or at night (The World Bank 2007). The Asian Development Bank (2012) used such findings to recommend

increased women participation in construction and transportation authority. The intent was to have women voice and create infrastructure improvements throughout the construction process, rather than upon completion. The European Parliament enacted a resolution in 2012 that recognized women do not use transportation equally and require additional safety measures. This resolution led to several changes, including a 2015 resolution to increase employment opportunities for women in transportation work, including improving safety and wages (European Institute for Gender Equality n.d.).

Engage Stakeholders to Implement and Enforce Gender-Based Policies

Each gender analysis tool recommends a committee, governing body, or other stakeholder group that can effectively carry out the practices set forth from a gender analysis. These stakeholders should include a wide variety of representatives, including community organizations, academics and experts (Government of Canada 2018). Having varying perspectives can help identify additional needs and assets in achieving the goals the analysis identified. Groups involved with carrying out the goals of the analysis should be trained in gender analysis and gender-based benchmarks (Government of Canada 2016). Gender analysis training helps ensure that agencies are able to uniformly adopt and appropriately enforce policies.

Create Continuous Monitoring System

The final step in gender analysis is never truly complete. It is important to develop a monitoring system that can continuously evaluate the effectiveness of the policies put in place. The system should identify the successes as well as gaps of policies as they are implemented and enforced (Government of Canada 2016). The systems should also include the ongoing commitment of stakeholders to view progress from a variety of perspectives. The ACIDI/VOCA Gender Analysis, Assessment, and Audit Toolkit (2012) provides guidelines on ways to audit programs and policies to determine their incorporation of gender considerations. The government of Sweden completely refocused to center on feminism based on gender equality research. The government relies on a 2001 report on women in transportation as the basis for subsequent decisions in all policies, including transportation (Polk 2003). The goal is to set up a framework that allows policy makers to determine the effectiveness of their gender considerations.

Key Considerations in Gender Analysis

In addition to the steps above, the existing gender analysis tools recommend important data collection methods that can significantly affect findings. Gender analysis should include both quantitative and qualitative data, as well as primary and secondary data. The prime existing national data set is the National Household Travel Survey. When collecting data, the methods should be sensitive to gender. If most women in the subject area work longer hours or likely will have children with them during the evening, surveyors should identify a time that can accommodate women and may need to arrange for childcare, for example. Data collection should also be sensitive to ensure that enough information is collected from both men and women to determine clear differences and the reasons behind those differences.

Table 7. List of Gender Analysis Toolkits Identified

Toolkit, Guide, or Policy	Author
Evaluating Complete Streets Policies: A Guide for Practitioners	AARP Government Affairs, Smart Growth America
Gender Analysis, Assessment, and Audit Toolkit	ACDI/VOCA
Gender Tool Kit: Transport, Maximizing the Benefits of Improved Mobility for All	Asian Development Bank
Gender Based Analysis Plus	Government of Canada
Feminist Government	Government of Sweden
Mainstreaming Gender in Road Transport: Operational Guidance for World Bank Staff	The World Bank Group
Jhpiego Gender Analysis Toolkit	USAID, Johns Hopkins University

Chapter VI: Scan of Complete Streets Plans

Normative Frameworks of Complete Streets Plans

Complete Streets plans present their normative frameworks through stated goals, visions, and intentions. In the 11 exemplar plans we discuss in this chapter, we found an emphasis on sustainability, safety, public health, economic growth, and equity/inclusion in their stated goals.

Sustainability language focused on reducing pollution by encouraging the use of clean energy and eliminating car trips. Safety goals highlighted pedestrians and other vulnerable road users. Public health language often referred to the health benefits of active transportation. Economic growth language described improvements to a city’s multimodal infrastructure to attract young and highly educated people to move to the city and to make shops and restaurants more accessible.

Almost by definition, all Complete Streets plans advocate for the inclusion of non-motorized transportation modes on streets that have traditionally been dominated by cars. Some plans, such as those that are the focus of this analysis, consider equity beyond travel mode and discuss social equity for communities that have been underserved by the transportation system (Table 8). For example, Fayetteville, AR aims to “consider the needs of diverse populations” including urban, rural, mobility impaired, older, and younger travelers (City of Fayetteville, 2020). Brevard County, FL looks to “pursue equitable distribution of projects, programs, and funding” (Brevard County, 2019). Adding gender equity to the stated goals and purposes would not only be consistent with the existing mission and vision of these plans, but it would also bolster equity aims and help achieve them.

Table 8. Complete Streets Plans' Stated Purposes and Goals

Community	Stated Purposes and Goals
Fayetteville, AR	“1. A transportation network that is safe for all users. 2. A transportation network that is equitable [Consider the needs of diverse populations (urban, rural, mobility impaired, elderly, children, and others)]. 3. A transportation network that emphasizes multi-modal mobility. 4. A transportation system that promotes and supports economic growth and sustainability.”
Los Angeles, CA	“1. Adopt a Vision Zero policy and develop an action plan. 2. Incorporate safety for pedestrians into all street designs and redesigns. 3. Collect data consistently and uniformly. Conduct outreach citywide to advance Vision Zero goal.”

Manteca, CA	<p>“1. Allow all users to move safely on City bicycle and pedestrian networks. 2. Develop convenient, low-stress bicycle and pedestrian networks that connect Manteca residents and visitors to destinations in the city and other jurisdictions. 3. Ensure bicycle and pedestrian networks are well-maintained. 4. Increase bicycling and walking in Manteca to support improved public health and reduced chronic diseases related to inactivity, increased economic activity along commercial corridors, improved air quality, and reduced greenhouse gas production.”</p>
Brevard County, FL	<p>“Establish a well-connected, safe, and comfortable bicycle and pedestrian network. Partner to educate, enforce, and engineer safe use of facilities. Empower people of all ages and abilities to walk or ride bicycle regularly. Increase awareness of the network, safe practices, and public health benefits. Pursue equitable distribution of projects, programs, and funding.”</p>
Indian River County, FL	<p>“The County’s goal through the Bicycle and Pedestrian Master Plan Update is to accommodate current bicycle and walking use and to encourage increased use of bicycling and walking in the future.”</p>
Jacksonville, FL	<p>“The [Plan] articulates a series of guiding principles that establish the importance of dramatically improving the walking and bicycling environment in Jacksonville, to save lives and ensure a bright and sustainable economic future for the community.”</p>
St. Petersburg, FL	<p>“Transportation systems that are inclusive, environmentally sustainable, promote economic development, and lead to a healthier St. Petersburg.” Including: 1. Safe and comfortable access. 2. Mobility options for an integrated transportation network. 3. Transportation efficiency that promotes reliable travel times for all modes. 4. Social equity [Investments made for bicycling, walking, and transit access in traditionally underserved neighborhoods.]”</p>
Ames, IA	<p>“The values promoted by the City of Ames Complete Streets Policy include safety, connectivity, access, fiscal responsibility, and quality of life. Complete Streets enhance the environment, economy, sense of place, preservation of historic resources, and aesthetics of the community, making Ames a healthier, more sustainable, and equitable place to live.”</p>
Highland Park, IL	<p>“To...provide opportunities for safe active transportation, recreation, and fitness activities; connect neighborhoods, parks, schools and business areas with facilities to provide an enjoyable alternate form of transportation; educate the community about the opportunities for, and benefits of, walking, running and bicycling; and encourage residents to participate in these activities.... Promoting a safe non-motorized transportation network isn’t just a healthy, sustainable thing to do, it is an equitable policy...people of color have the highest rates of walking and bicycling rates are higher in communities of color; however, it is also people of color who are disproportionately affected by traffic violence.”</p>
Lenexa, KS	<p>“...to support local land use, health, safety, and economic development through a multimodal approach to the planning, design, construction, operation, and maintenance of their transportation networks.”</p>
Portland, OR	<p>Goals: safety, multiple goals [safe, complete, interconnected, multimodal, fulfills daily needs for people and businesses], great places,</p>

	environmentally sustainable, equitable transportation, positive health outcomes, opportunities for prosperity.
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How Do Complete Streets Plans Define Gender Equity and Social Inclusion?

Of the plans we analyzed, only a handful mentioned gender or sex in their vision, policy, analysis, recommendations, or public engagement. Of these, only Portland, OR explicitly recognized women as a demographic group whose identity uniquely affects their relationship with the built environment. The plan stated that Portland should prevent adverse effects of emerging travel modes so that they do not harm historically underrepresented groups, including women.

The majority of plans defined equity with respect to transportation modes—equity means including pedestrians and cyclists in traditionally car-oriented transportation environments. For instance, Indian River County, FL recognized cyclists and pedestrians as “legitimate users of all roadways,” and deserving of appropriate infrastructure.

Plans also approached inclusion by stating that multimodal transportation includes “everyone” broadly. Lenexa, KS justified the need for a Complete Streets policy because “...ensuring that all users are considered in the street development process, Lenexa will...improve everyone’s access, safety, and comfort” (City of Lenexa, 2019: 4). Indian River County, FL argued that implementing pedestrian and bicycle infrastructure would have widespread benefits because “a broad range of people rely on bicycle and pedestrian travel” as indicated by their diverse trip purposes (Indian River County, 2020: 55).

At the same time that plans justify widespread benefits of investment in walking and cycling, they also assert that specific groups of travelers would uniquely benefit from such investment. Consistent with national guidance on Complete Streets, most plans also call attention to “age and ability” as relevant demographic factors. Advancing transportation equity may mean providing more mobility and access to travelers with limited access to cars, such as younger travelers who are too young to drive, older travelers who have ceased driving, people who are nondrivers because of medical conditions or disability, or low-income households with limited or no access to cars. Indian River County, FL recognized that “Households in poverty and households with no access to a car may depend on walking and bicycling as their primary mode of transportation” (Indian River County p. 37).

Certain plans expanded their frameworks for social inclusion beyond age, ability, and car access. Plans that discussed social equity most thoroughly included indicators such as: Limited English Proficiency (LEP) populations, non-white populations, geographically underserved communities, and homeless populations. For example, the Fayetteville, AR plan used three practical working definitions of social inclusion: 1) when identity is framed as trip purpose, users include residents, businesses, students, and visitors; 2) when identity is framed by travel mode, users include pedestrians, transit riders, cyclists, parking space users, and others; 3) when identity is framed as a population, users are urban, rural, mobility impaired, elderly, children, and others (City of Fayetteville, 2020).

Plans commonly converted population-level factors such as socioeconomic status into place-based indicators using spatial information and maps. Manteca, CA addressed social inclusion by using data to locate disadvantaged areas (City of Manteca, 2020). Lenexa, KS also mapped demographic factors such as poverty rates, disabled rates, youth population, elderly population, limited English proficiency population, minority population, and zero-car households to indicate “where the greatest need for alternative transportation services is located” (City of Lenexa, 2020: 26). The plans did not conceptualize transportation equity as something diffuse or mainstream, which may be a challenge for issues such as disability and gender, which are not necessarily spatially coincident with patterns of racial residential segregation and racialized transportation infrastructure investment, for example.

How Do Plans Propose to Create Inclusive Complete Streets?

We were interested in how plans would translate equity goals from rhetoric to the built environment. This process can happen through data collection, public engagement, policy making, project prioritization, performance evaluation, or other means.

We found that Portland, OR reinforced its social equity goal in multiple sections of the plan. For example, the plan included a policy to ensure that the benefits of new mobility were distributed equitably and that the vehicles and processes associated with new mobility would not harm underserved communities such as women, people experiencing disabilities, and communities of color. The plan’s public participation section also provided a list of local communities and organizations to engage in the planning process, including many organizations representing underserved communities.

Performance measurements and data collection present another opportunity to implement equity goals. Many Complete Streets plans include city or county maps with data about various demographic groups. For example, a plan from Lenexa, KS includes demographic information about poverty rates, disabled population, youth population, elderly population, limited English proficiency population, minority population, and presence of zero-car households. Places with high concentrations of those demographic groups would, therefore, have the greatest need for Complete Streets infrastructure. St. Petersburg, FL was the only plan we read that recommended creating performance metrics, such as crash and injury rates, using data disaggregated by gender, race, mode, age, ethnicity, and ability status (St. Petersburg, 2018: 39)

Public engagement processes were also areas where issues of equity and social inclusion received attention. In an attempt to include voices from historically underserved populations, planners in Indian River County, FL held community workshops in American Disability Act (ADA) accessible buildings in communities with a higher concentration of low-income households and minority populations. Additionally, the workshops were structured so participants worked in small groups and could voice their concerns directly to planning staff rather than discussing their concerns in front of a large group. Other plans aimed to create partnerships with local community interest groups and pay attention to organizations that represent disadvantaged populations. None of the plans that we read as part of our qualitative analysis included reference engaging organizations that represented the interests of women, gender minorities, or caregivers specifically.

How Gender Equity and Social Inclusion Are Implied in Complete Streets Plans

Although Complete Streets plans included few references to gender, sex, and social identity in general (beyond age, ability status, and occasionally economic status), the images in the plans include pictures of people of all ages, genders, abilities, ethnicities, and racial backgrounds utilizing and enjoying streets for a wide array of purposes, including care trips. The implication is that the plans' proposed changes, which would invest in built environments that support pedestrian and bicycle travel, will also advance diversity, equity, and inclusion.

For example, we know that women and girls are a minority of cyclists, yet photos of women and girls on bicycles are prominent in Complete Streets plans. Figure 4 provides two examples, from Highland Park, IL and Manteca, CA where the plans' cover images present women and girls as cyclists. In addition to images of women and girls riding bikes, plans frequently include images of women pushing strollers (Figure 5 provides two examples from the Los Angeles plan), women or men holding the hand of a child, or boys and girls riding bikes. Women and women's travel are

not represented in the text or data analysis in Complete Streets plans, but their bodies and lives are visible through the use of imagery.

Fainstein (2014) observed that planners “call for a physical heterogeneity that would promote a corresponding social mixing” (pp. 11) and Complete Streets plans offer evidence of her proposition. Complete Streets plans detail the “corresponding social mixing” of proposed changes to the built environment with images, rather than words or data. The photographs and renderings included in the plans depict a diverse array of people enjoying public streets, even without clear policies—or even words—that directly challenge gender and racial inequalities in transportation. Somehow, the Complete Streets plans will result in physical heterogeneity that, in turn, will have positive effect on social diversity.

Jacksonville, FL used renderings of proposed street designs to show not only the multimodal transportation system but also a diverse array of people utilizing the streets in diverse ways. An image of a residential area is photoshopped into a vibrant and racially diverse neighborhood street that depicts a man pushing a stroller, two young siblings walking side by side, and two African American pedestrians. This suggests that images are used to assert an idealistic vision of how a city or county could look if they implement more multimodal infrastructure.

Figure 4. Images of Women and Girls as Cyclists, Highland Park, IL and Manteca, CA

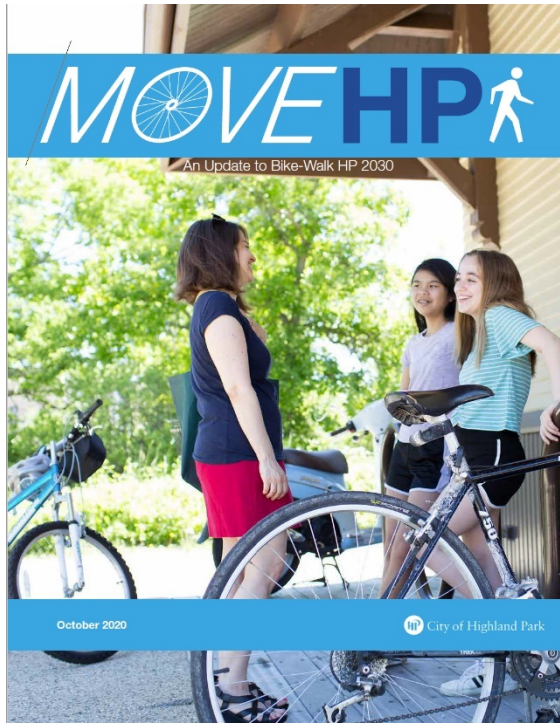


Figure 5. Images of Women with a Stroller, Los Angeles Plan



A SAFE CITY

Making our streets and communities the safest in the nation

Great Streets are safe streets that can form the heart of attractive neighborhoods. Mayor Garcetti and LADOT are committed to prioritizing community safety as a fundamental livability issue for LA. In 2012, nearly 80 pedestrians were killed in collisions with motor vehicles in Los Angeles, accounting for 40% of all deaths from traffic crashes. Every person killed is one too many, and it is the goal of LADOT to eliminate all traffic fatalities in the city by 2025. We have a lot of work to do to realize this goal.

LADOT will improve the collection and analysis of data about where and why fatal collisions occur, and use this knowledge to implement better street designs that are safer for people traveling by all modes. We will be a voice in the community, leading the development of messaging and policies that address traffic crashes as a serious public safety issue. Our efforts will be equitable, providing benefits to all reaches of the city and for Angelenos of all ages.

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Figure 6. Rendering of Social Diversity Outcomes of Complete Streets Projects, Jacksonville, FL



Complete Streets plans are more likely to imply gender inclusion with images than with language, but they sometimes do include language that obliquely references gendered issues of caregiving. Vocabulary such as families, parents, schools, and children imply consideration of care work, which is associated with women but not solely the work of women. For example, Brevard County, FL reported that parents drive their children to school due to a “cultural shift” despite “reasonable bike/ped access,” which leads to traffic congestion. At the same time, carless parents in Brevard County walked children to school out of necessity. Brevard County talked about a “‘mobility desert’ analogous to a food desert,” indicating that care work is especially difficult to perform for parents without cars. Care-related transportation is clearly a concern for Complete Streets plans. In fact, Fayetteville, AR included safe access to schools as one of its main priorities. To the extent that children, schools, and parenting are represented in Complete Streets plans, we can say that gender equity is an important local issue.

Next Steps Toward Gender Equity and Social Inclusion in Complete Streets Plans

Though we found that the plans we analyzed were generally well written, robust, and effective, we believe there are two clear next steps that planners could take to advance gender equity and social inclusion in these plans.

- 1) Disaggregate data by gender, age, race, ethnicity, or other characteristics to better understand travel behavior, safety, and transportation investment needs. Bespoke surveys about community transportation should also include questions about care-related travel as well as issues of concern for women and caregivers. Performance measures can be constructed to measure equitable progress for men, women, and gender minorities.

Sánchez de Madariaga (2013) argues that transportation data should include an umbrella category that accounts for the mobility of care to combat implicit androcentric assumptions about travel behavior and how the city should be used. Travel behavior surveys should contain categorizations for care trips, or trips taken to perform caring or home related tasks, which are responsibilities traditionally disproportionately performed by women. Sanchez de Madariaga argues that mobility of care “provides a framework for recognizing, measuring, making visible, valuing and properly accounting for all the travel associated to those caring and home related tasks needed for the reproduction of life.” When analyzing land use, planners should pay attention to care-related land uses such as schools, health care services, social services, and services for the elderly and people with disabilities.

- 2) The public engagement process is a promising point of intervention to increase social inclusion and gender equity in urban planning. Many plans already outline how they forge partnerships with groups that address age and ability concerns, like the American Association for Retired Persons (AARP) and local disability rights groups. Planning organizations should also forge partnerships with groups representing issues of concern for women and families.

Conclusions

Our qualitative analysis of 11 Complete Streets plans revealed a number of important findings regarding gender equity and social inclusion. We found that when plans list social equity and inclusion as a broad goal, they usually intend to include groups who have been modally excluded due to lack of automobile access. Thus, when plans consider social inclusion, it is with regard to

groups with obvious barriers to car access such as the elderly, the young, people experiencing disabilities, and zero-car households. We recommend that in addition to considering the unique needs of communities who have barriers to car access, that planners use metrics that identify unmet needs and unique challenges to communities and groups that do not have visible barriers to automobile access but might experience limited mobility in another way. In addition to planners aiming to include communities with limited automobile access, many plans claim to include ‘everyone,’ broadly ‘regardless of’ any identity factors that might affect an individual's mobility. Only a handful of plans discussed inclusion of underrepresented groups such as gender, racial, and ethnic minorities.

When implementation referenced social inclusion, it was often used as a framing device and the plans included few specific policies to ensure social equity. When plans discussed social equity and inclusion more thoroughly, it was in sections that dealt with data collection and with public engagement.

We found that there are aspects of Complete Streets implementation plans that include few references to gender and but nevertheless include gender implications. Plans include imagery of diverse users utilizing streets for a wide variety of purposes, and often for care work specifically. This implies that a change to the physical environment will improve social equity and diversity, even if the policies do not set out to do so specifically. Further aspects that have gender implications include discussions of schools, parents, and children’s travel, because these issues are closely tied to the concept of the mobility of care.

Chapter VII: Quantitative Analysis of Gender in Milwaukee’s Travel Patterns

The first part of this report reviewed existing literature, collected guidance and best practices from relevant gender analysis toolkits, and assessed the current state of Complete Streets planning practice. Through this synthesis we determined that a gender-aware Complete Streets planning process would benefit from collecting and analyzing disaggregated transportation data that is already widely available.

In this chapter, we provide an exploratory, descriptive analyses of an example data set. We focus on the National Household Travel Survey (NHTS) as a potential source of information about travel behavior for a wider range of households and individuals. The NHTS data are available for Wisconsin through the Add On program.

General Mobility Patterns in Milwaukee

Table 9 presents the disaggregated data for the general mobility level for men, women, boys, and girls in the study area. Whereas about half of all adults traveled to more than one place on the day of the travel survey, a quarter of adults did not make any trips at all.

Table 9. General Mobility Patterns, by Gender and Adult/Child Status, Milwaukee, WI, 2017

	Men	Women	Boys (<16 years)	Girls (<16 years)
Did not travel	417 (26.9%)	490 (27.8%)	149 (45.2%)	138 (43.8%)
Loop trip around home	29 (1.9%)	18 (1.0%)	5 (1.5%)	7 (2.2%)
Traveled to 1 place (other than home)	281 (18.1%)	291 (16.5%)	84 (25.5%)	64 (20.3%)
Traveled to >1 place	822 (53.1%)	961 (54.6%)	92 (27.9%)	106 (33.7%)
Total	1549 (100%)	1760 (100%)	330 (100%)	315 (100%)

We then focus on the trip characteristics of the people who traveled during the survey day. After data cleaning by excluding observations with missing values, there are 2,335 people over 16 years old and 356 children under 16 remaining. Table 10 summarizes their socio-demographic characteristics.

Table 10. Socio-demographic Characteristics of Travelers, by Gender and Adult/Child Status, Milwaukee, WI, 2017

	Men	Women	Boys (<16 years)	Girls (<16 years)
Age	Median=50	Median=50	Median=10	Median=10
Race:				
Non-Hispanic white	880	980	120	126
Non-Hispanic black	97	138	19	17
Hispanic	64	68	26	19
Asian	30	29	3	6
American Indian	1	2	0	0
Native Hawaiian	1	0	0	0
Others	27	18	13	7
Education:				
<high school	73	66	NA	NA
High school or GED	180	210	NA	NA
Some college or associates degree	311	339	NA	NA
Bachelor's degree	315	364	NA	NA
Graduate or professional degree	221	256	NA	NA
Household type:				
2+ adults with children under 16	242	254	149	150
2+ adults with no child	562	546	NA	NA
Single adult with children under 16	16	45	32	25
Single adult with no child	179	279	NA	NA
Others	101	111	0	0
Household income:				
<= 24,999	149	181	28	22
25,000~49,999	169	257	26	22
50,000~149,999	628	640	91	92
>150,000	154	157	36	39
Household size	Median=2	Median=2	Median=4	Median=4
Worker	813	820	NA	NA
Non-worker	287	415	181	175

Trip Characteristics

The trip characteristics indicators encompass the factors sensitive to gender norms, including number of trips, total miles traveled, total travel time, number of locations, total people traveled with, total household member traveled with, number of trip purposes, number of trips by different travel modes, and number of travel modes used.

Table 11 presents gender differences in each trip characteristics variables for people over age 16, controlling for age, household income, household type, and worker status.

Table 11. Gender Differences by Trip Characteristics, Adults (over 16 years), Milwaukee, WI, 2017

Trip characteristics	Men		Women		p value	Estimation method
	median	mean	median	mean		
Number of trips	4	4.39	4	4.60	0.0685	Negative binomial regression (NB)
Total travel distance (miles)	25	35.88	22	32.74	0.3619	Linear regression
Total travel time (minutes)	75	89.99	75	86.97	0.2338	Linear regression
Total people traveled with	0	2.45	2	3.04	0.0349*	NB
Total household members traveled with	0	1.35	0	1.71	0.0393*	NB
Total number of locations	3	2.60	3	2.63	0.4846	NB
Total number of purposes	2	2.29	2	2.41	0.0374*	NB
Number of travel modes	1	1.22	1	1.23	0.9890	NB
Number of trips by private vehicles	3	3.66	4	4.01	0.0002*	NB
Number of walking trips	0	0.48	0	0.45	0.1917	NB
Number of bicycling trips	0	0.07	0	0.02	0.0008*	NB
Number of trips by transit	0	0.13	0	0.10	0.1657	NB
Number of short trips (<15 min)	2	2.48	2	2.78	0.0193*	NB
Number of medium trips (15~25 min)	0	0.75	0	0.80	0.0345*	NB
Number of long trips (>25 min)	1	1.15	1	1.02	0.0180*	NB

The results show that gendered patterns in Milwaukee are partially consistent with the literature. In particular, significant results are: (1) women traveled with more people, both in general and in households. (2) Men made more trips by private vehicles and bikes. (3) Women made a larger number of short trips (< 15 minutes) whereas men made a larger number of long trips (> 25 minutes).

Trip Purposes, Mobility of Care

In the original NHTS dataset, tour anchors are home, work, and others. In this analysis, we create two other anchor locations for social and care-related trips (Sánchez de Madariaga, 2013).

Therefore, the anchors are home (H), work (W), care (C), and social (S). Table 12 presents the process of obtaining anchor locations for trip purposes.

Table 12. Frequency of Trip Purposes with Home, Work, Care, and Social Trip Anchors, Milwaukee, WI, 2017

Anchor locations	Description	Codes (using "whyfrom" and "whyto")	Frequency "whyfrom"	Frequency "whyto"
Home activities (H)	Regular home activities	01	4,095	4,146
Work or school (W)	Work from home (paid), work, work-related meeting/trip, attend school as a student	02, 03, 04, 08	2,099	2,046
Maintenance and care (C)	Drop off/pick up someone, attend child care, attend adult care, buy goods, buy services, buy meals, other general errands, health care visit	06, 09, 10, 11, 12, 13, 14, 18	4,124	4,113
Social, recreation, and others (S)	Volunteer activities (not paid), change type of transportation (07), recreational activities (visit parks, movies, bars, museums), exercise (go for a jog, walk, walk the dog, go the gym), visit friends or relatives, religious or other community activities, and others	05, 07, 15, 16, 17, 19, 97	1,693	1,706

Table 13. Frequency of Combined "whyfrom" and "whyto" to Construct Trip Purpose Variable

Purpose	Description	Frequency	Rank
HH	Home-Home trip	254	8
HW/WH	Home-Work trip	2,345	2
HC/CH	Home-Care trip	3,533	1
HS/SH	Home-Social trip	1,855	3
WW	Home-Other trip	324	7
WC/CW	Work-Care trip	910	5
WS/SW	Work-Social trip	242	10
CC	Work-other trip	1,492	4

CS/SC	Care-Social trip	810	6
SS	Social-Other trip	246	9

Note: H, W, C, S are anchors.

Table 13 shows that Home-Care trip has the highest frequency, more than Home-Work trips, which has the second-highest frequency.

Table 14. Comparison of Proportion of Trips for Care, Work, and Social Trip Purposes, Milwaukee, WI, 2017

Purpose	Description	Frequency	Percentage
HC/CH	Home-Care trip	3,532	29.4%
WC/CW	Work-Care trip	910	7.6%
SC/CS	Social-Care trip	810	6.7%
CC	Care-Care trip	1,491	12.4%
HW/WH	Home-Work trip	2,343	19.5%
HH/WW/SS/ HS/SH/WS/SW	Others	2,914	24.3%

Note: the first four purposes in this table are care-related (with 'C' included), reflecting "mobility of care."

Table 14 shows that care-related trips, whether linked with home, work, or other purposes, constitute 56.1% of the total trips.

Table 15 presents a gender difference analysis for the mobility of care.

Table 15. Gender Differences in the Mobility of Care for Adults (ages > 16 years), Milwaukee, WI, 2017

Trip purpose	Men		Women		p value	Testing method
	median	mean	median	mean		
Number of HC/CH trips	1	1.26	1	1.44	0.0368*	NB
Number of WC/CW trips	0	0.36	0	0.36	0.3431	NB
Number of SC/CS trips	0	0.27	0	0.33	0.0821	NB
Number of CC trips	0	0.47	0	0.68	0.0001*	NB
Number of HW/WH trips	1	0.90	0	0.77	0.1622	NB
Number of other (HH/WW/SS/ HS/SH/WS/SW) trips	0	1.12	0	1.01	0.0381*	NB

The results show that women made significantly more home-care and care-care trips, men made significantly more trips categorized as “Others,” which are not care-related. However, in terms of work- and social-related trips, the gender difference is not significant.

Chapter VIII: Quantitative Analysis of Gendered Perceptions of Traffic Safety, Personal Security, and Neighborhood Environments in Milwaukee

The Milwaukee SHS Citywide Survey responses were analyzed to 1) demonstrate the use of a secondary dataset to explore possible gender differences in resident travel behavior and perceptions of traffic safety and personal security by travel mode, and 2) gain a deeper understanding of place-based perceptions of Milwaukee neighborhoods. Based on our initial literature review and other research/expert discussions, the research team focused on understanding and analyzing the theme of “safety” as this emerged as an important environmental consideration in promoting active transportation behaviors (walking, biking, transit use), particularly among women. Both traffic-related safety and crime-related safety (referred to here as “personal security”) perceptions were evaluated through the survey.

First, we used simple comparative statistics to quantify differences between women’s and men’s responses to specific survey questions. Table 16 shows differences in perceptions of traffic safety and personal security, and Table 17 shows differences in enjoyment of travel modes, travel behavior, perceptions of neighborhood characteristics, and other response variables. Most questions were answered similarly by women and men, but there were several significant differences by gender. We focus our discussion below on results from the survey that was mailed to randomly-selected residential addresses (columns 2 and 3). While smaller, this sample is more likely to represent the City of Milwaukee population than the convenience sample from the online survey.

There were no significant gendered differences in perceptions of traffic safety when using specific modes, but female respondents were significantly more likely than male respondents to perceive personal security barriers (specifically for walking, bicycling, and being an automobile passenger). Male respondents were significantly more likely than female respondents to mention homelessness/panhandling and theft/break-ins in their open-ended comments about personal security and mention lack of law enforcement in their open-ended comments about traffic safety.

Female respondents were significantly less likely than male respondents to rate their neighborhood parks as good, but no other neighborhood characteristics were perceived differently. Consistent with existing literature, women were significantly less likely than men to drive personal

automobiles to work. They were significantly more likely than men to take the bus to the grocery store. Women were significantly less likely than men to enjoy walking.

Overall, there were several distinct differences between results of the mail survey and the online survey. For example, mail survey responses showed that women were less likely than men to perceive walking and using an automobile (either as driver or passenger) as safe with respect to traffic. However, online survey responses showed that women were significantly more likely than men to perceive these modes as safe with respect to traffic. These differences likely reflect the perspectives of distinct survey populations: the randomly-selected mail survey respondents were spread more evenly across all Milwaukee neighborhoods and were more likely to represent people of color; the online survey convenience sample was concentrated more in White neighborhoods. Online survey respondents were also much more likely to be bicyclists (e.g., compare results for commuting to work by bicycle), which reflects the bicycle-focused e-mail lists and social media groups where the survey link was shared. The divergent results for particular survey questions suggest that gender differences interact with other socioeconomic characteristics. Further research should focus on the intersectionality between gender and race, ethnicity, income, and other variables.

Table 16. Gender Differences in Milwaukee Safe and Healthy Streets Survey Responses: Perceptions of Traffic Safety and Personal Security

Respondent Characteristic	Responses from mailing survey to random addresses			Responses from sharing online survey link via e-mail and social media		
	% of Women (n = 88) ¹	% of Men (n = 56) ¹	Significant Gender Difference	% of Women (n = 262) ¹	% of Men (n = 237) ¹	Significant Gender Difference
Perceive Mode as Safe with respect to Traffic Safety						
Walk	58.6%	62.5%		67.4%	59.7%	+
Bicycle	36.7%	44.4%		39.7%	40.1%	
Bus	40.3%	46.8%		62.6%	68.9%	
Automobile driver	55.3%	61.5%		67.8%	57.6%	++
Automobile passenger	53.0%	60.0%		66.1%	55.1%	++
Perceive Mode as Safe with respect to Personal Security						
Walk	50.0%	66.1%	-	68.6%	72.9%	
Bicycle	42.5%	57.4%	-	69.3%	74.2%	
Bus	35.1%	42.9%		59.6%	66.7%	
Automobile driver	62.7%	74.5%		82.0%	81.5%	
Automobile passenger	59.8%	73.6%	-	80.2%	80.8%	
Open-ended comments about traffic safety in neighborhood						
Lack of law enforcement	1.1%	10.7%	--	3.8%	2.1%	
Lack of yield to pedestrians	6.8%	5.4%		6.9%	10.1%	
Speeding problems	31.8%	35.7%		42.7%	32.5%	++
Red-light-running problems	12.5%	16.1%		12.6%	15.2%	
Passing on the right	2.3%	1.8%		5.0%	8.0%	
Issues with street design/infrastructure	10.2%	10.7%		9.5%	13.1%	
Open-ended comments about personal security in neighborhood						
Homelessness/panhandling	0.0%	7.1%	--	1.1%	3.0%	
Drug dealing	4.5%	1.8%		3.1%	0.0%	++
Theft/break-ins	5.7%	14.3%	-	13.7%	11.0%	
Violent crime	5.7%	1.8%		7.6%	6.8%	

Lack of police	2.3%	5.4%		1.5%	3.0%	
Lack of lighting	1.1%	1.8%		3.1%	2.1%	

1) The sample sizes represent the total number of survey respondents who identified as women or men. Of the 158 total mail survey respondents, 14 left the gender question blank. Of the 643 online survey respondents, 5 identified as non-binary, and 139 left the gender question blank. Note that the sample sizes are slightly lower for some questions due to non-responses to those particular questions.

2) Z-test of the difference in proportions: a significantly-higher proportion of women respondents than men respondents is indicated by + (90% confidence) or ++ (95% confidence); a significantly-lower proportion of women respondents than men respondents is indicated by - (90% confidence) or - - (95% confidence).

Table 17. Gender Differences in Milwaukee Safe and Healthy Streets Survey Responses: Neighborhood Perceptions and Other Variable

Respondent Characteristic	Responses from mailing survey to random addresses			Responses from sharing online survey link via e-mail and social media		
	% of Women (n = 88) ¹	% of Men (n = 56) ¹	Significant Gender Difference	% of Women (n = 262) ¹	% of Men (n = 237) ¹	Significant Gender Difference
Perceive Neighborhood Characteristic as Good						
Cleanliness	54.8%	54.5%		68.3%	63.7%	
Lighting at night	59.0%	64.3%		55.2%	62.0%	
Sidewalks	50.6%	50.0%		51.1%	51.1%	
Street pavement	29.8%	20.0%		24.5%	26.7%	
Traffic speeds	26.7%	30.9%		21.5%	16.0%	
Bus service	36.4%	41.2%		52.0%	57.3%	
Places to walk to	49.4%	61.8%		75.1%	82.2%	-
Opportunities for exercise	57.3%	64.3%		81.5%	84.7%	
Parks	56.6%	75.9%	--	81.7%	85.2%	
Street trees & landscaping	56.1%	58.9%		73.1%	75.8%	
Friendliness of neighbors	63.2%	72.2%		77.1%	79.3%	
Commute to Work by Mode						
Walk	7.1%	11.1%		13.8%	13.1%	
Bicycle	2.4%	3.7%		14.6%	32.2%	--
Bus	2.4%	0.0%		12.3%	19.9%	--
Automobile driver	50.0%	72.2%	--	60.4%	58.9%	
Automobile passenger	4.8%	1.9%		8.1%	5.5%	
Go to Grocery Store by Mode						
Walk	13.3%	16.4%		27.6%	37.9%	--
Bicycle	2.4%	1.8%		11.1%	32.8%	--
Bus	4.8%	0.0%	+	3.1%	8.1%	--
Automobile driver	81.9%	90.9%		86.2%	78.3%	++
Automobile passenger	13.3%	10.9%		17.2%	16.2%	
Open-ended comments about changes to walking, bicycling, being active since COVID						

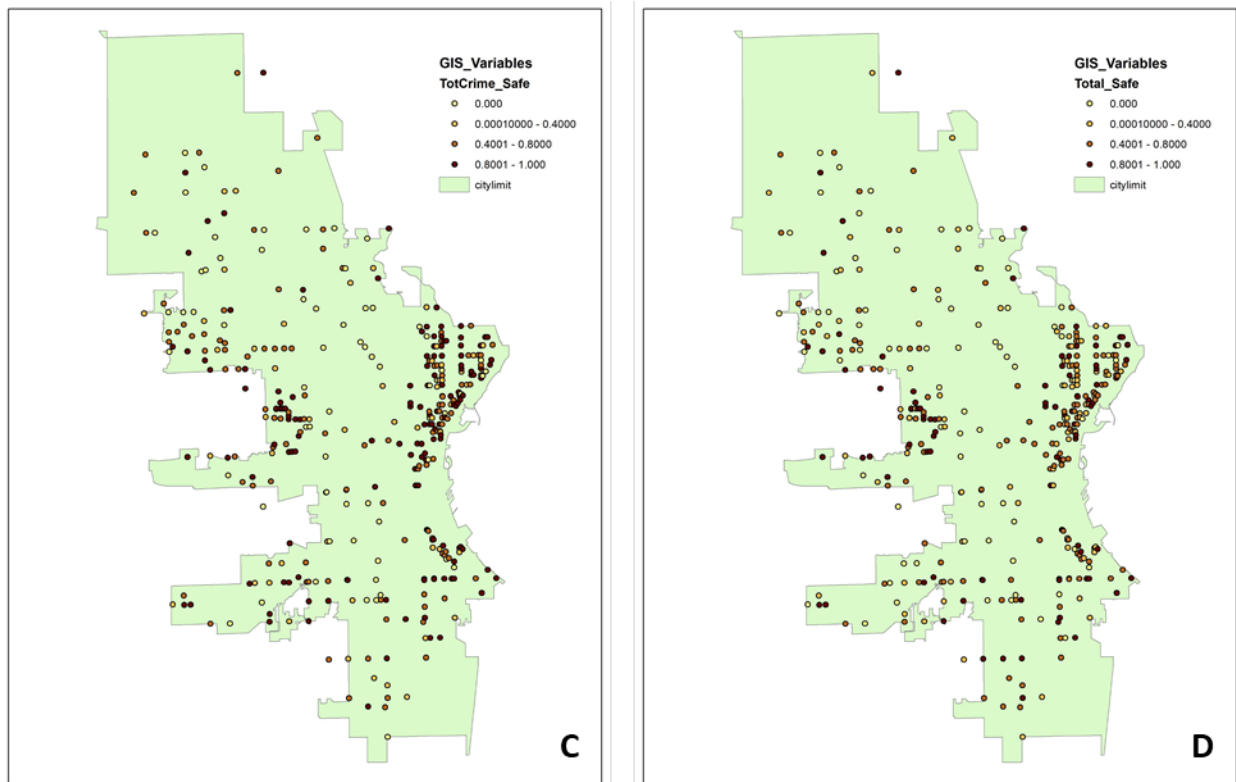
Walk more	25.0%	16.1%		34.4%	23.6%	++
Bicycle more	8.0%	7.1%		14.5%	13.5%	
Open-ended comments about activities that you would do more if traffic/sidewalk/trail conditions were better						
Walk more	28.4%	26.8%		28.2%	25.3%	
Bicycle more	20.5%	26.8%		40.1%	38.0%	
Mode is Enjoyable						
Walk	65.1%	80.0%	-	86.6%	87.8%	
Bicycle	40.3%	50.0%		61.5%	79.3%	--
Bus	13.3%	5.8%		22.6%	39.1%	--
Automobile driver	53.0%	51.9%		48.3%	39.7%	+
Automobile passenger	49.4%	48.1%		43.6%	34.7%	++
Respondent Characteristic						
White	61.3%	74.5%		85.8%	91.3%	-
Black	28.8%	19.1%		5.5%	2.6%	
Hispanic	3.8%	6.4%		2.8%	2.6%	
Age 75+	14.8%	14.3%		4.2%	3.0%	
Has a disability	19.5%	20.0%		9.9%	6.0%	
Household with 0 vehicles	11.4%	3.6%		5.0%	8.0%	
Lives within a NRSA	32.2%	18.5%	+	25.9%	27.0%	

1) The sample sizes represent the total number of survey respondents who identified as women or men. Of the 158 total mail survey respondents, 14 left the gender question blank. Of the 643 online survey respondents, 5 identified as non-binary, and 139 left the gender question blank. Note that the sample sizes are slightly lower for some questions due to non-responses to those particular questions.

2) Z-test of the difference in proportions: a significantly-higher proportion of women respondents than men respondents is indicated by + (90% confidence) or ++ (95% confidence); a significantly-lower proportion of women respondents than men respondents is indicated by - (90% confidence) or -- (95% confidence).

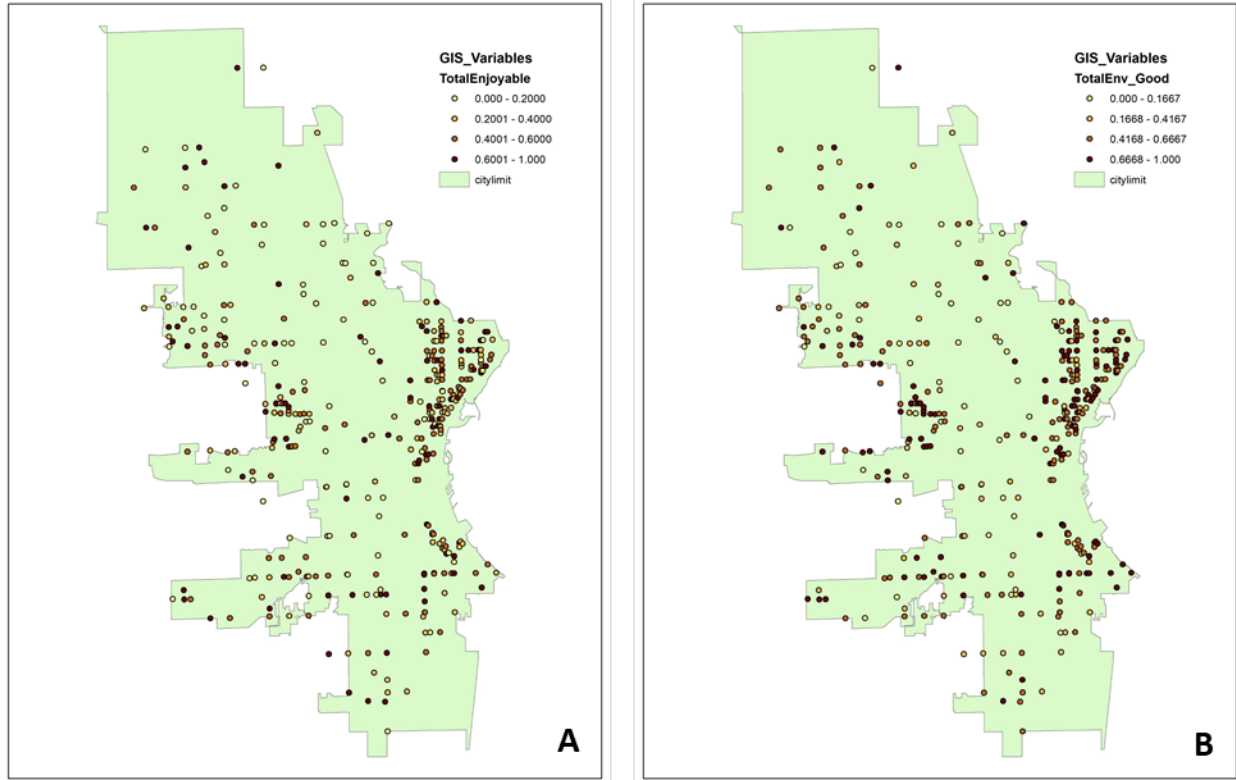
Next, we mapped the responses by home location and conducted a geographic analysis to examine spatial patterns of place-based perceptions. No significant differences in perceptions were detected based on gender, but our maps provide an overview of places that were consistently ranked as safer compared to others (Figure 7 and Figure 8). In general, wealthier neighborhoods had higher safety and security rankings, while lower-income neighborhoods (corresponding with the City of Milwaukee NRSAs) had lower rankings. This insight can be used to further address gender-based (female) needs in planning, prioritizing and implementing Complete Streets initiatives. Places with consistently high scores can be further analyzed for environmental qualities that can be emulated as best practices whereas places with low scores can be prioritized for improvements or new projects.

Figure 7. Survey Respondent Rating of Quality of Personal Security and Traffic Safety in Milwaukee (2020)



Maps showing how respondents rated their neighborhoods with respect to safety. Map A: Areas with the darkest brown points indicate places where respondents consistently felt safe against crime (low crime) while using various transportation modes. Map B: Areas with the darkest brown points indicate places where respondents felt consistently safe with respect to traffic conditions (speed, roadway design, driving behavior).

Figure 8. Survey Respondent Rating of Quality of Neighborhood Environments in Milwaukee (2020)



Maps show how respondents rated their neighborhoods with respect to the quality of their environment. Map A: Areas with the darkest brown points indicate places where residents consistently rated that they enjoyed their experience traveling by various modes. Map B: Areas with the darkest brown points indicate places where respondents consistently rated that the quality of their environment with respect to lighting, pavements/sidewalks, destinations, amenities, aesthetics, social opportunities, and other elements that encourage active living was high.

Chapter IX: Qualitative Analysis of Gender Differences in Perceptions of Livable and Complete Streets

Livability, the collection of physical and social factors that influence one's quality of life in any given location, can influence individuals' decisions about where to live and work, as well as how to travel. New Urbanism and Smart Growth both enhance livability through design and placemaking, including interventions in streets and transportation systems such as Complete Streets (Godschalk, 2004). Livability and Complete Streets are intersecting ideas, particularly at the smaller scale where interventions of livability may include pedestrian-oriented development and design.

The American Association of Retired Persons (AARP) livability index includes factors encompassing multiple scales beyond that of streetscapes:

- Housing affordability and access
- Safe and convenient transportation options
- Neighborhood access to life, work, and play
- Clean air and water
- Access to quality health care
- Civic and social involvement
- Inclusion and other opportunities

The concept of livability may have different meanings depending on one's gender, domestic responsibilities, stage in the life course, or other factors that interact with gender. Existing research demonstrates the general lack of gender awareness in planning and gender concepts are not included in indices such as these. Historically, planning for the connection of life and work has centered around the needs of men (Ciocoletto, 2016). A gender-aware planning process would acknowledge residents' roles in domestic responsibility and stage of the life course (Watson, 1999; de Madariaga, 2013). Empirically, women often carry out multiple short trips for care or household-related responsibilities, while men take few, longer trips, usually commuting to work (Watson, 1999).

In this study, we assess the feasibility of detecting gender differences in perceived livability using surveys of livability and walkability, surveys that were not originally designed to detect such differences. If gender differences can be identified and analyzed with these data, then our analysis

would suggest that revisiting existing surveys would be a potential tool for advancing gender analysis for Complete Streets planning. Many communities already use similar surveys to create Complete Streets plans. We also examine the shortcomings of this method and propose new approaches that could be deployed to bolster the potential for Complete Streets to advance gender equity.

Findings from the Denver Neighborhood Connections Survey

We analyzed N=4,474 unique codes across the six categories. Of these, N=2,475 (55%) were associated with positive perceptions of physical, social, and travel environments and N=1,999 (45%) represented negative perceptions. Men and women reported positive and negative perceptions in similar proportions. Fifty-seven percent of women's responses reported a positive perception compared to 53% of men's responses; 43% of women's responses reported a negative perception compared to 47% of men's responses. Positive perceptions about the physical environment (N=1,251) and negative perceptions about the travel environment (N=1,066) had the highest number of responses overall (Table 16).

Men's and women's comments were not statistically different at the $\alpha=0.05$ level in four of the six categories: physical environment/positive and negative, social environment/positive, and travel environment/negative (Table 16).

Men and women had statistically significant different perceptions of livability at the $\alpha=0.05$ level in two categories: social environment/positive and travel environment/positive. In the positive social environment category men more frequently reported a positive social atmosphere or general prosocial environment whereas women more frequently called out a specific relationship to people or neighbors (Table 18 and Table 19). Women were also more likely to mention diversity and participating in community building activities as facets of a positive social environment.

Table 18. Perceived Livability Issues, by Gender, Denver, CO, 2015

Framework Category	Response frequency		Proportion of responses		p value
	Women	Men	Women	Men	
Physical environment (negative)	255	220	1.00	1.00	0.805
community severance/lack of services	28	25	0.11	0.11	
construction	9	7	0.04	0.03	
gentrification/poor planning	10	7	0.04	0.03	
lulu/land use conflict	61	60	0.24	0.27	
maintenance/vacancy	125	106	0.49	0.48	
trash/cleanliness	22	15	0.09	0.07	
Physical environment (positive)	790	461	1.00	1.00	0.217
arts	39	24	0.05	0.05	
civic/amenities/public improvements	80	46	0.10	0.10	
grocery	42	13	0.05	0.03	
history/architecture/design/aesthetic	52	26	0.07	0.06	
housing/private improvements	103	69	0.13	0.15	
parks/open space/golf	94	60	0.12	0.13	
restaurant/bar/entertainment	146	89	0.18	0.19	
shopping/business/services	125	81	0.16	0.18	
trees/vegetation	109	53	0.14	0.11	
Social environment (negative)	283	175	1.00	1.00	0.099
civic	25	16	0.09	0.09	
crime	51	35	0.18	0.20	
disorder	101	77	0.36	0.44	
gentrification	14	10	0.05	0.06	
neighbor	17	9	0.06	0.05	
noise	28	11	0.10	0.06	
safety	22	6	0.08	0.03	
spillovers	25	11	0.09	0.06	
Social environment (positive)	382	227	1.00	1.00	0.016
atmosphere	59	49	0.15	0.22	
community building	71	38	0.19	0.17	
diversity	39	16	0.10	0.07	
friendly/prosocial	98	69	0.26	0.30	
people/neighbor relationships	72	31	0.19	0.14	
safety	21	12	0.05	0.05	
SES	14	11	0.04	0.05	
shared values/ideology	8	1	0.02	0.00	
Travel environment (negative)	632	434	1.00	1.00	0.166
air/noise pollution	67	42	0.11	0.10	
bikeability	23	7	0.04	0.02	
disrepair	54	40	0.09	0.09	
infrastructure	56	44	0.09	0.10	
parking	91	67	0.14	0.15	
safety	103	57	0.16	0.13	
traffic	228	170	0.36	0.39	
walking or public transit	10	7	0.02	0.02	
Travel environment (positive)	367	248	1.00	1.00	0.002
accessible	27	23	0.07	0.09	
bikeability	23	18	0.06	0.07	
infrastructure & traffic calming	18	14	0.05	0.06	
proximity	160	116	0.44	0.47	
public transit	21	24	0.06	0.10	
walkability	118	53	0.32	0.21	

Table 19. Specific Livability Attributes of Neighborhood Social Environments, Denver, CO, 2015

Simplified codes in the social environment/positive category	Disaggregated codes
Atmosphere	art vibe, atmosphere, calm, character, charming, Colfax, comfortable, culture, downtown feel, eclectic, familiar area, fun, hip, historic, homey atmosphere, housing diversity, low profile, mostly quiet, not crowded, not much change, peaceful, quiet, unique, up and coming, urban feel, vibe, vibrant
Community building	Active, active community, activity, block party, community, community event, community involvement, community pride, cultural event, dog walking, event, family walk, foot traffic, happy hour, life, lively, lots to do, music, neighborhood association, neighborhood newsletter, newsletter, organizations, parade, people out, people outside, people walking, porch sitting, pot luck, schools, see people walking, seeing people out at night, seeing people walk and bike, social event, social scene, talking, yard sale
Diversity	age diversity, diverse, diverse ages, ethnic history, neighborhood mix, older population, women, young, young families, young people, young renter
Friendly, prosocial	acknowledge each other, attitude, caring, caring community, considerate, dog friendly, family friendly, friendly, happy here, helpful, interesting people, kid friendly, kindness, love it here, low crime, neighborhood pride, neighborly, people, pet friendly, pride, respectful, responsible, social
People, neighborhood relationships	caring neighbor, children, cordial neighbor, dog, family, friends enjoy visiting, know neighbors, long-time resident, look out for each other, mail carrier, neighbor, no high-rise housing, shop owner, stable, thoughtful people
Safety	safe
Socioeconomic status	Affordable, ease of living, educated, high SES, homeowner, homeowner pride, house upkeep, increasing property value, inexpensive, keep tidy, longtime owners, maintained property, maintenance, neighborhood growth, prestigious, pride of property, professionals, property value, revitalizing, tenure, well kept
Shared values, ideology	Democratic, liberal, local, no HOA, political alignment, politically progressive, tolerant

With respect to the positive travel environment, women more frequently reported positive walkability and men were more likely to report positive experiences with public transit. Codes describing walkability included: dog walking, pedestrian friendly, running, sidewalk, sidewalk distance from street, walk, walkable, and wide sidewalk. Codes describing public transit included: bus, light rail, public transportation.

Recommendations for Complete Streets Planning

Open-ended questions in the survey generated information about specific issues relevant to Complete Streets that may be perceived differently based on one’s gender. Though the analysis

identified statistically significant differences between men and women, the gender differences were subtle, and men and women also perceived many aspects of their environment similarly.

The survey was not designed to address questions of gender and public space. The questions did not prompt respondents for information about gendered tasks and roles. This suggests that existing approaches to Complete Streets, walkability, and livability planning are missing crucial information that cannot be fully recovered by examining existing data more closely.

One strategy for future surveys would be to collect household- or individual-level information on gender roles. These questions could identify who makes trips, decisions, and other care-related activities for the household. Some possible open- or close-ended questions to include in surveys using a gender lens include:

- What are typical household tasks you are responsible for?
- What are typical caregiving tasks are you responsible for?
- How do you make decisions about transportation among members of your household?

Perceptions of livability come from how we act with mobility, social, and physical environments. Complete Streets project influence social, physical, and mobility environments in ways that can improve livability. Therefore, including gender equity in Complete Streets may be a method to increase gender equity across several domains of livability.

Chapter X: Workshops with Complete Streets Practitioners

Our series of collaborative workshops aims to elevate gender equity, sustainability, and the arts in Complete Streets policy. These perspectives help us to characterize mobility, transportation system performance, and the human experience of streets as public spaces more accurately. Thus, they allow us to optimize transportation strategies, increase equity, and more completely realize the potential of Complete Streets to foster wellbeing. In addition, those who participate will begin to develop skills to be transformative practitioners. We planned to hold workshops in July, October, and November of 2021 respectively. To date the first workshop has been completed. Here we describe the workshop and share some preliminary results.

Re-imagining Complete Streets for Everyone

On July 15, 2021, we convened a diverse group of practitioners from five universities and colleges, four cities, as well as representation from the Wisconsin Bike Federation, the Wisconsin Council of the Blind and Visually Impaired, and the National Complete Streets Coalition. This was the first of three workshops that would together explore the ways that gender and strategies for social inclusion, sustainability, and the arts can increase the impact of Complete Streets.

Pre-workshop Reading and Reflection

Before the workshop participants reviewed the following readings related to Complete Streets recommendations and the mobility of care concept and answered a simple survey. This allowed us to begin the interactive workshop with common reference points and “primed” for group analysis.

Smart Growth America and National Complete Streets Coalition. 2017. *The Best Complete Streets Policies of 2016*. June 2017.

Sánchez de Madariaga, Inés. 2018. *The Mobility of Care: Introducing Gender-Aware Concepts in Transportation Planning*. 2018.

Introductory Overview

The session began with an overview of the key findings from the literature review on gender and transportation. The introduction also included presentation of the three analytical lenses to be

applied: gender analysis, the UN sustainable development framework and arts-based approaches to transportation and place-making more generally. While the session was to focus on gender analysis, the fact that sustainability and the arts were presented briefly enabled the group to integrate these themes into the discussion. Thus, this first workshop accomplished the gender analysis objective and also reflected ideas related to the other two dimensions that will be the focus of future workshops. Before proceeding to a more in-depth discussion of gender analysis, the group discussed the results of the pre-workshop survey.

Debrief of Pre-workshop Readings and Survey: Key Insights

- Implementing Complete Streets plans and equity and inclusion policies without adequately and meaningfully engaging underserved communities could unintendedly harm those communities.
- There is a gap between good policies, best practices, and implementation.
- Inclusion of health and equity considerations in transportation plans is becoming standard practice.
- Among the most important issues for the advancement of gender equity and mobility of care is the need for better data collection so that mobility of care can be captured adequately and also to that disaggregation of data can be done to characterize the access, comfort, and perceived safety for travel by gender, age, race, economic status, ability status. Where sub-populations are too small for disaggregated data to be significant, special studies (qualitative or quantitative) should be considered.

Gender Analysis and Complete Streets

In preparation for small group discussions, a detailed framework for gender analysis was presented and some gender and transportation research results were highlighted. It was acknowledged that gendered approaches can be exploitive, accommodating, or transformative. In the interest of striving toward transformative practice a gender analysis model was presented (UNDP Toolkit 2001). Critical questions went beyond assessment of differential needs for women to considering and the impact that gender and gender-related inequities might have. Topics for inquiry include consideration of gender roles, assets and vulnerabilities, power, decision-making, and systemic issues. The presentation also reviewed trip-chaining and other gendered patterns of mobility related to care work. This has direct implications for Complete Streets in terms of frequency and schedule of services, designing truly accessible inter-modality, carrying capacity, safety, and perceived safety.

Debrief: How can Complete Streets guidance reflect a fuller gender lens

- Include the gendered lived experience of women, men, girls and boys and the full range of non-binary identities related to sex and gender.
- Disaggregate data to fully carry out gender analysis related to Complete Streets. Further, disaggregating what is already collected is necessary but not sufficient, new measures should be added with intersectional gender analysis and mobility of care in mind.
- Encourage municipalities and jurisdictions to measure the full range of travel patterns and mobility of care: care trips, escorting to school, and trips to receive health care, make social connects etc.
- Shift focus from making things better for women as primary caregivers (accommodating) to supporting the redistribution of care work/social reproduction labor (transformative).
- Some of our practices unintentionally reinforce patriarchy or white supremacy. This can happen when we make changes within existing structures instead of changing the basic structure. Instead, we need to reimagine these streets.
- Policies are vague and broad to allow local flexibility. However, inclusion of specific examples of options across a range of heterogenous settings can help people to envision what gender equity looks like.
- Create good illustrative policies and examples that can be used as a starting point. Such information can participation efforts at localization that are needed to accelerate change.
- Implementation is a challenge and also requires a gender equity awareness and praxis. Good policy doesn't automatically result in good implementation.
- NCSC/smart growth has a limited capacity in supporting or enforcing implementation. Change will have to rely on local commitment to quality and local systems of accountability.
- We need to develop policies that foster safety and take perceived danger seriously. Is there a silence to break here in the Complete Streets recommendations?
- Complete Streets should do its part to support realization of Human Rights and avoidance of related infringements.
- Participation and multiple perspectives from community members in design and implementation are essential for realization of equity.
- Planning processes and outcome should include of indigenous and local history and knowledge.
- Streets are both venues for mobility and destinations in themselves. How can transportation plans support expression of culture, health and thriving, local economies, and the arts. How

can we have friendly policies toward the informal sector to create win-win scenarios for prospective? We can get ideas from how this happens in other countries and cultures.

- Cost-benefit analysis needs to assess more than just traffic, but also benefits to health, economy, community cohesion, environment, and, most importantly equity.
- These will be phased efforts – encourage phasing strategies and design criteria that leave the door open to increasing inclusion.
- Guidelines run the risk of a return to universal design and the pitfalls of that. How can we find a balance so that plans are context specific?
- More specifics and tools that allow detailed systematic analysis would be helpful to develop and evaluate Complete Streets plans. “Good work is in the details.” For example, design elements could be mentioned for consideration: spacious sidewalks, lighting, eyes-on-the-street, socially welcoming features, space, shade, snow clearance and how it makes a street environment, slower speed, shorter block lengths so pedestrians have more route choices.
- Complete streets are built around the idea of “cars” but also historical decision-making where highways were put through neighborhoods, and redlining related practices were prevalent if not the norm. They were also built around the social norm of a two-parent (male and female) nuclear family, one-income family where caretaking is assigned to one partner, usually the woman. How can we build for different kinds of households and all the individuals within.
- Complete Streets is a best case for inclusivity in planning – so adding value with intersectional gender analysis here makes sense. We can build on what is already good.
- Collective design processes, and full inclusion will make some trade-offs and tensions explicit. And people have different visions. What community-building and decision-making strategies can be used so that optimal, effective and beautiful Streets are the result?
- There's a place for behavioral scientists to work with transportation planners and researchers to foster positive behaviors and welcoming inclusive norms be established. How can we address toxic masculinity? This is a serious issue underlying how people experience the street. It is important for DPW to work with the school system, health system, and neighborhood groups to foster a positive masculinity.
- What messages are in and around our streets- and how can we change or improve them. For example. What if billboards didn't objectify women but instead are vertical gardens?
- Integrating beauty and nature into built public spaces is a spiritual antidote. Consider the many benefits of trees.
- It's a norm to have a walkable, multimodal, safe living experience during college in people's lives. How can we leverage that experience for others and in other stages of life?

- The pandemic led experiments and changes in the street that were incremental and temporary. What can we learn from this to build back better?
- Not all Complete Streets should look the same. What does it mean to have “Complete Networks?” As we explore this, it is fundamental to remember that everyone needs to have access to mobility.

Debrief: Complete Streets Elements - Appendix A 1-10

Element 1. Vision and intent. A Complete Streets vision states a community’s commitment to integrate a Complete Streets approach into their transportation practices, policies, and decision-making processes. This vision should describe a community’s motivation to pursue Complete Streets, such as improved economic, health, safety, access, resilience, or environmental sustainability outcomes. The vision should acknowledge the importance of how Complete Streets contribute to building a comprehensive transportation network. This means that people are able to travel to and from their destinations in a reasonable amount of time and in a safe, reliable, comfortable, convenient, affordable, and accessible manner using whatever mode of transportation they choose or rely on.

- Complete Streets should be developed to support not only mobility and access to quality transportation for all, but also and the broader societal goals of sustainable development and equity. A gender lens can help.
- Aspire to streets that work as social and cultural spaces rather than just conduits transportation.
- Aesthetics and enjoyment should be included in the experience of transportation and mobility.
- CS could explicitly address gender equity and mainstreaming, and the mobility of care.
- Clarify how to measure and value safety, risk and perceived safety in our design processes. Acknowledge the various aspects of safety, in addition to crashes.
- Clarify how Complete Streets might take seasonal, cultural and weather variations into account.
- Clarify quality for Complete Streets to right-sized completeness, prioritizing the right type and number of features considering context, sustainability, and resources.
- CS does not mean putting a bike lane on every street or a bus on every corridor. Rather, it requires decision makers to consider the needs of diverse modes that use the transportation system, including but not limited to walking, biking, driving, wheeling/rolling, riding

public transit, car sharing/carpooling, paratransit, taxis, delivering goods and services, and providing emergency response transportation.

- The vision should not always assume that we must build from the existing transportation system. While that can be an important way to get started gradually, it may also be useful to reimagine our transportation system and start from there.
- Policies should give guidance on adaptation to local conditions so that people can shape a policy that reflects their setting and situation.
- This aspirational vision should be reflected where there is now a disconnect: in the education of professionals, representation in hiring so that the process is truly representative and leadership and technical contributors are also diverse.

Element 2. Diverse Users. Complete Streets are intended to benefit all users equitably, particularly vulnerable users and the most underinvested and underserved communities. Transportation choices should be safe, convenient, reliable, affordable, accessible, and timely regardless of race, ethnicity, religion, income, gender identity, immigration status, age, ability, languages spoken, or level of access to a personal vehicle. Which communities of concern are disproportionately impacted by transportation policies and practices will vary depending on the context of the jurisdiction. Policies are not necessarily expected to list all of these groups. For example, some communities are more racially homogeneous, but have extreme income disparities. The best Complete Streets policies will specifically highlight communities of concern whom the policy will prioritize based on the jurisdiction's composition and objectives.

- This is very general and encourages flexibility and pragmatism for municipal or state to define the populations included. How can we ensure that small sub-populations are included appropriately and fully in this balance? Are there examples of tools and approaches for communities to achieve inclusion?
- How can this be done to be most useful to designers? For example, is there guidance on use of model language, case examples, etc.
- Complete Streets could share working definitions related to care trips and encourage municipalities and jurisdictions to measure this.
- It is interesting to note that gender equity was only added to CS as a consideration recently, in 2018, and the experience of women is only minimally addressed. Given that women are such a large percentage of the population in virtually all settings, this is an issue that needs to be addressed for fully.
- It would be important to include a broader gender spectrum in data collection. Perhaps a standard set could be recommended.

- The inclusion of the voice of women and diverse women at all levels – community members, professionals, political leaders, should be encouraged. It is not just who is being served, but who is making a decision, designing, having a voice.
- Age-based differences should be taken into account in relation to mobility, use of technology, caregiving/receiving, and household type.
- Encourage silos among advocacy groups so that they can work together in productive ways.
- Make the street network also welcome to non-residents of the community. How do we assign jurisdiction? How do we incorporate history and regional/contextual characteristics in addressing equity? Incorporation of regional relationships and relational elements/purposes, such as freight networks and other regional traffic movements.
- Adapt guidelines to support both social bonding within groups and bridging across groups. The goal should be for people to have access to both kinds of experiences in their lives. Multigenerational and multicultural spaces should be nurtured, as well as spaces for sub-groups to gather.
- This part of the analysis can also take into account sustainability, local economy and particularly supporting shared economy.

Element 3. Commitment in all projects and phases. The ideal Complete Streets policy has a strong commitment that all transportation projects and maintenance operations account for the needs of all modes of transportation and all users of the road network

- This element can be a stronger reminder that good policy, with good guidance and vision does not result in effective implementation. Gender inclusive strategies for implementation can support full inclusion across the spectrum and enhance implementation. This is not just who engages, but, also how people engage dialogue and work together. Evidence-based practices for inclusive teams are needed.
- There are over 1600 CS policies in the US but many fall short on implementation. We can learn from the successes and failures, and this is a large group of professionals who might want information about best practices for inclusive implementation.
- Gender mainstreaming best practices can help to address this. Including mobility of care, safety, and a notion of welcoming spaces can provide the kind of specificity that makes implementation better.
- One strategy for insuring gender and social inclusion in all phases is to bring diverse professionals into the agency so that the very important knowledge and consciousness does not always have to come from outside.

Element 4. Clear, accountable exceptions. Effective policy implementation requires a process for exceptions to providing for all modes in each project. The exception process must also be transparent by providing public notice with opportunity for comment and clear, supportive documentation justifying the exception. The Coalition believes the following exceptions are appropriate with limited potential to weaken the policy. They follow the Federal Highway Administration’s guidance on accommodating bicycle and pedestrian travel and identified best practices frequently used in existing Complete Streets policies.

- The idea of exceptions is language that we receive from compulsory, one size fits all systems. This could be reframed more positively in terms of the Complete Streets ideal for specific settings.
- Complete Streets can be misunderstood as a “more is better model” – where we envision similar full-service streets in all settings. This homogeneity may not be optimal or desirable. Better articulation of what quality is allows for “right-sized” thinking.
- There was discussion about a distinction between Complete Streets and Complete Networks in the group. Further definition of what this means and how it might help to clarify appropriate exceptions, design options and phasing is needed. While some embraced the idea of networks, others shared the caution that the gold standard must be mobility for all.

Element 5. Jurisdiction. Creating Complete Streets networks is difficult because many different agencies control our streets. They are built and maintained by state, county, and local agencies, and private developers often build new roads. Individual jurisdictions do have an opportunity to influence the actions of others, through funding or development review. In the case of private developers, this may entail the developer submitting how they will address Complete Streets in their project through the jurisdiction’s permitting process, with approval of the permit being contingent upon meeting the Complete Streets requirements laid out by the jurisdiction. Creating a Complete Streets network can also be achieved through interagency coordination between government departments and partner agencies on Complete Streets.

- Efforts and building awareness within networks of transportation professionals, those that implement policy are important, but we must work interprofessional, and across overlapping governance structures to be effective.
- CS policies could encourage working groups with varied agency, organization representatives, professions, etc. who address the street environment holistically from the

height of curbs, to the bus schedules, to the messages on billboards, to the life of the trees. Health in All Policies models borrowed from public health can apply here.

- All of this can be done with social inclusion and gender-mainstreaming principles.
- Create poly-governance mechanisms like a Complete Streets Network that include governmental actors, professionals, advocacy groups, community organizations.
- Develop models for Cost-benefit analysis and social impact assessments to show the full value of Complete Streets as it benefits different sectors, populations and environments, now and in the future.
- While the costs to fund Complete Streets can seem a barrier, holistic valuing will help the public to see the value and make funding and private-public partnership more likely.

Element 6. Design. Complete Streets implementation relies on using the best and latest state-of-the-practice design standards and guidelines to maximize design flexibility. Creating meaningful change on the ground both at the project level and in the creation of complete, multimodal transportation networks requires jurisdictions to create or update their existing design guidance and standards to advance the objectives of the Complete Streets policy.

- Explore ways to operationalize Complete Streets thinking with design.
- Focus on design guidance and standards de-emphasizes innovation, creativity, and arts-based (as opposed to engineering-based) design principles.
- Involve groups with experience in mobility of care, different ability statuses, from Europe and around the world as well as US (where this practice is behind other regions).
- In addition to the right solutions that “work” we need more community context to capture intangibles like beauty and hospitality. These can have a dramatic impact on whether “what works” gets used.
- We have a lot of design guides, what tools and approaches are missing. How would incorporating mobility of care change the physical design?
- Include the experience of the person travelling along with the built and natural environment in the conversation. This is often left out, with the exception of the car driver’s perspective.
- Design will be a sticking point for mobility of care if users can interpret design guidelines and envision concrete plans and actions that reflect a gender perspective.
- Appreciate the organizational context of design and the whole design process.
- People’s lives are not lived only in the right of way, and things that the city does not control (e.g, overgrown shrubs from a private property) make a challenge. Transportation professionals will feel that they can’t do anything about things outside of the right of way.

This is where working across sectors and with community groups can help, a culture of care, city of care, can be built around Complete Streets.

- What aspects of the street that really make a difference for people to feel welcome and safe? How can we be sure we have resources for the desired characteristics? More street lighting falls into this category. If it was not scoped in the beginning of the project, chances are they won't materialize. We need research to know what makes a difference – such as slowing traveling cars, lighting, traffic calming measures, sidewalks for family walking together, length of blocks, art and public messages that are positive and inclusive and free of objectification of women and all historically marginalized people. Some of this will emerge from developing a local culture, not imposed rules or guidelines.
- Different characteristics have different tradeoffs in different places. For example, shade in Florida - people may prefer shady places even if they are more dangerous because of the protection from heat. Some areas in Tampa are walkable but small, they could be slowly expanded.
- Tough question (from men's perspective): what do we do for the social environment so that it is safe and welcoming for women? Perhaps: provide services and daycare, improve lighting at Subway stations How can we reduce real risks and the perception of risk.
- Social norms around harassment, machismo, how do we change that culture?
- Center the wellbeing of children and youth more in the CS policy, with an awareness of gender issues.
- How can we design for multiple, multi-generational and multi-cultural use? Research from sociology and other fields can be brought to bear on this question.
- Create space and opportunity for the informal economy to create more vibrancy on the streets (street vendors, carts, etc.)
- Include design aesthetics and elements that evoke joy, play and other aspects of spontaneity. Consider the human right to play and enjoyment of the environment.
- Modern design standards can conflict with federal and other jurisdictional requirements-how can we navigate this?
- We need to develop a deeper understanding of what “standards” mean? Is it one size fits all? How do we do context-specific adaptations and layering of design elements?
- Consider contributions of moral philosophy and human rights – the work of Rawls, the International Convention on Rights of Women, People with Disabilities are highly relevant. Also and especially the Capabilities approach of Martha Nussbaum articulates specific capabilities that society should support in its built and social structures.

Element 7. Land use and context sensitivity. An effective Complete Streets policy must be sensitive to the surrounding community including its current and planned buildings, parks, and trails, as well as its current and expected transportation needs. Specifically, it is critical to recognize the connection between land use and transportation. Complete Streets must be designed to serve the current and future land use, while land use policies and zoning ordinances must support Complete Streets such as by promoting dense, mixed-use, transit-oriented development with homes, jobs, schools, transit, and recreation in close proximity depending on the context. Given the range of policy types and their varying ability to address this issue, a policy, at a minimum, requires the consideration of context sensitivity in making decisions. The best Complete Streets policies will meaningfully engage with land use by integrating transportation and land use in plans, policies, and practices. The Coalition also encourages more detailed discussion of adapting roads to fit the character of the surrounding neighborhood and development, as well as the consideration of unintended consequences such as displacement of residents due to rising costs of living.

- Plans we read never use “gender, woman, man, girl” etc. but they could just as they use parent and schools → this establishes a point of entry where Complete Streets can make a change.
- Projects explicitly about schools and a case where we are really thinking about all ages and abilities because all kinds of children ages and care givers. Partnerships with the schools in safe routes to schools can have lessons for major employers and other settings. Also, at school hands are full, limited capacity, so will have practices that are relevant for mobility of care.
- Consider the characteristics of households and residents and plan accordingly. How many households include children, elders, women-headed household, single person households. How many have jobs, cars, biking skills or interests etc.
- Schools, healthcare, hospitals, clinics, human services → how do these land use considerations factor in. How can we build these back into neighborhoods?
- Encourage Grants to take ownership of streets, do murals, walking clubs, holding meetings in streets
- Emphasize streets as places for people
- Bike boulevards are sometimes built in wealthier neighborhoods where they are less needed because there’s a feeling of ownership of the streets. How can we program and phase roll out of CS features so those most in need get services first?
- What do we do if streets cannot be modified to meet even minimum safety standards? Are their ethical responsibilities of transportation professionals to speak out about this, rather than just implement something that is not effective?

- Big goals need to be approached with smaller incremental steps in many cases.
- Encourage Grant opportunities for active streets
- Encourage political openness for dialogue and engagement-- walking town halls, office hours, and more. Connect with residents, connect with places, on the streets!
- Encourage mixed-use zoning, with gender analysis that would lead to more eyes on the street at different times of day.
- Shorter block lengths are more manageable and welcoming to all people.
- Sprawling land uses necessitate high-speed travel (mostly by personal automobiles), which creates arterial streets that are very difficult to make into “complete streets.” A broader planning solution would more compact land use to facilitate complete street development. Women are more likely to be multimodal, so they may be impacted the most negatively by sprawling development and auto-oriented arterial streets.

Element 8. Performance measures. Communities with Complete Streets policies can measure success in a number of different ways, such as miles of bike lanes, percentage of the sidewalk network completed, number of people who choose to ride public transportation, and/or the number of people walking and biking along a street. They can also measure the impact of Complete Streets on the other motivations and objectives specified in the policy, such as health, safety, economic development, resilience, etc. The best Complete Streets policies will establish performance measures in line with the goals stated in their visions. Performance measures should pay particular attention to how Complete Streets implementation impacts the communities of concern identified in the policy. By embedding equity in performance measures, jurisdictions can evaluate whether disparities are being exacerbated or mitigated. Policies should also set forth an accountable process to measure performance, including specifying who will be responsible for reporting on progress and how often these indicators will be tracked.

- Collect data about care trips that that can be disaggregated and complement with qualitative information about care work and transportation, and care work in relation to streets as destinations and places for care. Data collection should also include behaviors, risks and perceptions.
- Collect data that can be disaggregated and gather other kinds of information that will inform service schedules, strategies for multiple stops, multi-modal transit, and carrying capacity.
- Explore best methods to assess the many aspects of safety (related to mode of transit, walking or waiting, transportation, infrastructure, harassment, theft and interpersonal

violence). Incident reports can be one source, but they are biased by the fact that incident is going to be low if utilization is decreased because of perceived risk.

- Reframe conversations and data collection to understand perceived risk as another type of system failure and injustice that must be addressed by creating safe and welcoming spaces. The tendency to understand it as unfounded or exaggerated fear should be discouraged and refuted.
- How do we ask survey questions in ways that will allow people to answer honestly about their full experience using streets (including the social environment)? What methods of data collection might work the best?
- Consider if some divided roads should simply not be for pedestrian use rather than trying to make the Complete Streets – if it is not done completely it can be more unsafe for pedestrians.
- We need arterials to serve spread out lands, how should they be thought of and “counted” in terms of Complete Streets. Similarly, how do we justify building tunnels.
- How can we use better data for planning and systems change? Measure the full lifecycle of data collection-implementation-outcome-impact

Element 9. Project selection criteria. A Complete Streets policy should modify the jurisdiction’s project selection criteria for funding to encourage Complete Streets implementation. Criteria for determining the ranking of projects should include assigning weight for active transportation infrastructure; targeting underserved communities; alleviating disparities in health, safety, economic benefit, access destinations; and creating better multimodal network connectivity for all users. Jurisdictions should include equity criteria in their project selection process and give the criteria meaningful weight.

- Explicit mention of gender equity as essential to better meeting the needs of 50% of the population, and especially where inequities are compounded by historical marginalization due to factors like race, income, age, ability and non-binary identify.
- Explicit criterion related to alleviation of sources of environmental degradation and promotion of sustainability. Perhaps this is already captured in environmental impact assessment.
- It could be useful to name mental health and obesity among the many health benefits.
- There could be a criterion related to the culture and history of the street as a place – projects that recognize and reflect honest historical awareness and efforts to create an inclusive and welcoming and education space considering that. Historical and cultural elements should be accurate, reparative, and formative of an inclusive present and future.

- Community participation is often suggested and should be required. Further, documentation such as how community input was sought, what groups were involved, what groups were not yet involved, what the inputs were, and how the community members themselves assessed the process could be provided to assist with ranking of projects. While these criteria can't substitute for authentic leadership for inclusion, this information can help to alleviate superficial rubber stamping and tokenism.

Element 10. Implementation steps. A formal commitment to the Complete Streets approach is only the beginning. The Coalition has identified key steps to implementation:

1. Restructure or revise related procedures, plans, regulations, and other processes to accommodate all users on every project. This could include incorporating Complete Streets checklists or other tools into decision-making processes.
2. Develop new design policies and guides or revise existing to reflect the current state of best practices in transportation design. Communities may also elect to adopt national or state-level recognized design guidance.
3. Offer workshops and other training opportunities to transportation staff, community leaders, and the general public so that everyone understands the importance of the Complete Streets vision. Training could focus on Complete Streets design and implementation, community engagement, and/or equity
4. Create a committee to oversee implementation. This is a critical accountability measure, ensuring the policy becomes practice. The committee should include both external and internal stakeholders as well as representatives from advocacy groups, underinvested communities, and vulnerable populations such as people of color, older adults, children, low-income communities, non-native English speakers, those who do not own or cannot access a car, and those living with disabilities
5. Create a community engagement plan that considers equity by targeting advocacy organizations and underrepresented communities which could include non-native English speakers, people with disabilities, etc. depending on the local context. This requires the use of outreach strategies such as holding public meetings at easily accessible times and places, collecting input at community gathering spaces, and hosting and attending community meetings and events. The best community engagement plans don't require people to alter their daily routines to participate. Outreach strategies should make use of natural gathering spaces such as clinics, schools, parks, and community centers.

- Gender should be included as a characteristic for inclusion on committees, in community input sessions, and among the professional staff and leadership involved in the program.
- In order to gain support for plan, good inclusive design work can and should be enhanced by effective communication that fosters behavior change
- In order to get good proposals adopted policy strategies that consider feasibility, policy windows and poly-governance strategies that will be needed. This is another capacity-building topic that could support the Complete Streets movement.
- These guidelines focus on effective practice for transportation professionals in the design process. Effective implementation strategies informed by implementation science and change management is also important. Even if we know where we are going, how can we get there from where we are, accelerate innovation, scale up and diffusion of what works.
- As we embrace an iterative design process, which will include changes and compromises, it is important to safeguard and effectiveness of the plan as well. This is an ethical responsibility of the technical experts – to uphold safety and evidence-based practice, while deferring to the collective process on other aspects of the plan. Clarity about scope of practice, and codes of ethics and conduct can be helpful here.
- In relation to gender and overall, clarify what makes an ideal Complete Street beyond more is better. CS can be misunderstood to mean that all features in the most expensive and technologically advanced form should be available on all streets. How can right-sized solutions that meet the needs of all be developed and promoted?
- In relation to gender and overall, work with other units to experiment and innovate. For example, traffic calming, parks, schools, and others.
- Social norms about gender, harassment and the lack of a culture of inclusion and welcome color the entire experience of moving through and being in the street for everyone. This leads to disparity in access, effectiveness and realization of benefits related to gender, and this is compounded by other forms of discrimination of historical marginalization. Transportation leaders cannot continue to dismiss this aspect of community public spaces as less important, part of (women’s) perception problem, or something to address after the infrastructure is in place. Gender mainstreaming, mobility of care concepts, as well as practices that reduce stigma and promote human dignity and rights

Next Steps

These workshop findings will be synthesized, and workshops 2 and 3 will build on the recommendations. Workshop 2, planned for September will include a novel holistic review (SDG 360 Analysis) of CS using the Sustainable Development goals. It will build on existing work

related to transportation overall and the SDGs but will focus in on Complete Streets. Workshop 3, planned for November, will focus on the arts and will explore how they can enhance Complete Streets strategies, leveraging mobility to support the creation of complete inclusive places and communities.

Based on these workshops the team intends to recommend specific, concise changes to the guidelines, develop a tool to evaluate plans to accompany the guidelines, and develop a workshop guide that can be used to facilitate revision and review of plans that incorporates gender analysis, the sustainable development framework, and the arts.

Chapter XI: Conclusions and Future Research

In this study we identified concepts and practices needed to support a gender-aware Complete Streets movement. We also demonstrated the use of these concepts and practices through pilot analyses and workshops with Milwaukee, WI and other communities.

Through literature reviews, we found that implementing existing Complete Streets policies may minimally advance gender equity even without special attempts at gender awareness because women are more likely to walk, ride transit, and have concerns about cycling. Beyond traditional Complete Streets investments in multimodal mobility and infrastructure, we identified 10 additional actions, supported by the literature, that represent next steps toward gender equity.

1. Use gender analysis in the Complete Streets planning process.
2. Combine questions of gender with questions of race, ethnicity, religion, county of origin, and other identity factors that are relevant to social inclusion in local communities.
3. Consider gender in multimodal travel behavior, particularly travel patterns and design requirements associated with caregiving.
4. Bring attention to the gendered social and cultural norms that shape travel behavior and public space and use Complete Streets as a point of entry into discussing (and potentially transforming) these norms.
5. Expand the definition of Complete Streets encompass the social spaces of streets and public spaces, beyond the physical environments of streets, cities, and towns.
6. Consider gender in planning for traffic safety and disaggregate safety data.
7. Value and elevate gendered patterns in crime and harassment in the transportation planning process.
8. Value and elevate perceptions of transportation environments in the transportation planning process.
9. Expand the definition of Complete Streets to encompass the spaces inside vehicles (e.g., public transit vehicles), as well as the use of vehicles.
10. Consider issues of human factors and ergonomics in Complete Streets plans and analysis.

Practitioners can address these multifaceted domains through gender mainstreaming, a process through which policymakers and planners consider the different needs of men and women to bring gender awareness to every stage of planning, design, and implementation. The effort to mainstream gender in Complete Streets can also serve as an opportunity to remove cisgender and

heteronormative conventions in both the practice and study of transportation planning, policy, and design.

To support the introduction of gender analysis and gender mainstreaming in Complete Streets, we reviewed existing gender analysis tools and found:

1. Gender analysis tools and recommendations differ based on the setting to which they are applied. Therefore, gender analysis for Complete Streets should reflect local contexts, needs, and considerations.
2. Gender analysis carried out in the public sector is most effective when accompanied by personnel training (Government of Canada 2016). Government employees and other stakeholders tasked with carrying out gender analysis for Complete Streets should be trained on the importance of gender analysis and what its findings mean.
3. Policies that arise from gender analysis techniques are only successful if they are enforceable. Toolkits from both Sweden and Canada highlight the importance of developing accompanying policies that regulate or otherwise enforce the new practices that come from a thorough gender analysis. Without this key component, gender aware Complete Streets policies would become benign and not achieve their goals (Polk 2003, Government of Canada 2016).
4. The national benchmarks for Complete Streets policies only recently included a gender component. Until 2019, the Smart Growth America and the National Complete Streets Coalition did not include gender as a factor that would be relevant to Complete Streets. In 2019, it included “gender identity” among the qualities that one would use to describe diverse users (Smart Growth America and National Complete Streets Coalition, 2019, 20). AARP also mentions examining gender when evaluating Complete Streets projects, though these suggestions do not affect how these projects are ranked and promoted.

We synthesized information from a sample of toolkits, resulting in five steps to analyze a Complete Streets policy or plan with consideration of gender. The five steps are:

1. Identify different transportation needs according to gender.
2. Evaluate how current road infrastructure is used differently by men and women.
3. Identify opportunities to maximize gender benefits and reduce barriers.
4. Engage stakeholders to implement and enforce gender-based policies.
5. Create continuous monitoring system.

Gender analysis of Complete Streets policies, plans, and programs will require quantitative and qualitative data to evaluate transportation needs by gender. Existing data sets commonly used for Complete Streets analysis may not provide sufficient information for carrying out the gender analysis process; the data sets may not include the relevant information, or they may not be widely available.

The American Community Survey, for example, is widely available and it does provide detailed information about the commute to work by gender and workers' access to private vehicles. But the American Community Survey only describes the travel of workers, which excludes the entire category of caregiving that accounts for a substantial proportion of women's travel. Practitioners and researchers will need new tools, methods, instruments, and data collection processes to create the data needed for gender analysis.

In this study, we conducted pilot analyses with existing data to understand what is currently feasible. We started with the National Household Travel Survey, which provides population-level information about travel, including care-related trips. The survey is nationally representative, which is not the scale at which practitioners or researchers would conduct a gender analysis of Complete Streets. Fortunately, Wisconsin is counted among the states that participates in the National Household Travel Survey Add-On program, which provides representative travel data at the sub-national scale.

We used the Add-On data to analyze travel patterns for Milwaukee. The results reveal gendered travel patterns in Milwaukee that are consistent with the literature. In particular, significant results included: (1) women are more likely to travel with other people, including other members of the household and non-household members; (2) men made more trips by private vehicles and bikes; and (3) women made a larger number of short trips (< 15 minutes) whereas men made a larger number of long trips (> 25 minutes). For all genders, home-based care trips had the highest frequency of all trip types, even more than home-based work trips, which had the second-highest frequency. Across all genders, care-related trips, whether originating from home, work, or another location, accounted for 56.1% of the total trips. The results also show that women made significantly more home-to-care and care-to-care trips, and that men made significantly more trips categorized as "other," which were not care-related. Gender was not significant for work and social trip purposes.

The analysis of travel patterns establishes consistency with the literature on gender and transportation, but how can this be applied to implement Complete Streets policies and plans? To

be relevant to Complete Streets practice, we also analyzed bespoke surveys about livability and walkability that are commonly used in the Complete Streets planning process. For Milwaukee, our quantitative analysis of closed-form questions about perceived walkability did not show significant differences by gender. Men and women who responded to the survey similarly rated the quality of the neighborhood environments and their perceptions of safety.

We used qualitative analysis of open-ended survey questions from a livability survey for Denver, CO as a test case to see if the words that respondents use to describe their perceptions might be more revealing of the themes we found in the literature. The analysis showed that women and men did perceive certain aspects of their streets and neighborhoods differently—specifically, the positive characteristics of the social environment and the positive characteristics of the travel environment. Yet, in four of the six categories we did not find significant gender differences in perceived livability.

What lessons can we learn from existing data to raise awareness of gender equity for Complete Streets? These pilot analyses of perceived walkability and perceived livability illustrate a type of reasoning that we would expect to find in a gender analysis process. In all three cases, we examined gender differences. The results showed a mix of differences and similarities. Whereas the travel patterns were consistent with the literature, we expected to see stronger gender differences in perceived walkability and livability. We cannot determine if the differences do not exist or if the survey was not sensitive to the differences.

The pilot studies suggest that using existing data for the gender analysis of Complete Streets will need to do two things. First, it needs to examine local data for gender differences. If there were differences in safe, mobility, access or other concerns, then this would be relevant to the planning process. Yet, the absence of difference does not necessarily mean it does not exist; it could be that the methods are not attuned to the topic. Therefore, the planning process also needs methods through which it can evaluate and apply issues presented in the literature, not only empirical gender differences.

Future data collection instruments, methods, and analysis will need to ask questions related to gender and caregiving from inception. Administrative settings will not be ideal for collecting sensitive information about harassment. Surveys will need to ask about caregiving.

We recommend that researchers and practitioners unite to develop respectful and evidence-based planning methods and tools that elevate gender in multimodal transportation. These may include

questions for surveys, model policy language, and collaborative forms of public engagement, to name a few. In tandem, we must expand what counts as data, as well as the methods to create it, to increase the legitimacy of subjective experience and perceptions of public space.

Our workshops with practitioners suggested several next steps and paths forward, including the need to recommend specific, concise changes to the guidelines, develop a tool to evaluate plans to accompany the guidelines, and develop a workshop guide that can be used to facilitate revision and review of plans that incorporates gender analysis, the sustainable development framework, and the arts.

Experiences from practitioners who participated in the workshop echo findings from the literature reviews, synthesis and analysis of Complete Streets plans and gender analysis toolkits, as well as analysis of secondary data. A selection of key next steps for advancing gender equity in Complete Streets planning and implementation include:

- Include the gendered lived experience of women, men, girls and boys and the full range of non-binary identities related to sex and gender.
- Disaggregate data to fully carry out gender analysis related to Complete Streets. Further, disaggregating what is already collected is necessary but not sufficient, new measures should be added with intersectional gender analysis and mobility of care in mind.
- Encourage municipalities and jurisdictions to measure the full range of travel patterns and mobility of care: care trips, escorting to school, and trips to receive health care, making social connections.
- Shift focus from making things better for women as primary caregivers (accommodating) to supporting the redistribution of care work/social reproduction labor (transformative).
- Some of our practices unintentionally reinforce patriarchy or white supremacy. This can happen when we make changes within existing structures instead of changing the basic structure. Instead, we need to reimagine these streets.
- Policies are vague and broad to allow local flexibility. However, inclusion of specific examples of options across a range of heterogenous settings can help people to envision what gender equity looks like.
- Create good illustrative policies and examples that can be used as a starting point. Such information can participation efforts at localization that are needed to accelerate change.
- Implementation is a challenge and also requires a gender equity awareness and praxis. Good policy doesn't automatically result in good implementation.

- The National Complete Streets Coalition has a limited capacity in supporting or enforcing implementation. Change will have to rely on local commitment to quality and local systems of accountability.
- We need to develop policies that foster safety and take perceived danger seriously. Is there a silence to break here in the Complete Streets recommendations?
- Complete Streets should do its part to support realization of Human Rights and avoidance of related infringements.

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Appendix A: Gender Analysis Options

Steps in Gender Analysis

The following table outlines the five steps described in this report to complete a gender analysis. Each step has accompanying methods that can help complete the step. The advantages and considerations for each method are outlined here, along with gender analysis toolkits that provide more information about the method. Finally, a priority level is assigned to each method: the “necessary” priority level indicates that this method is key to completing the step. Without a necessary method, the step cannot be adequately completely. The “encouraged” priority level indicates that the method would help inform the process of carrying out the step, but the step can be completed without an encouraged method. This table is intended to be a guide for gender analysis projects based on components pulled from other gender analysis toolkits. Each method can use either primary or secondary data to complete the accompanying step.

Identify different transportation needs according to gender				
Method	Toolkit Source	Advantages	Considerations	Priority
Travel Diaries	The World Bank Group (2010) Government of Canada (2018) Garrett (2014)	Provides picture of a person's travel habits over a 24-hour time period; offers quantitative and qualitative data regarding a person's travel modes	Based on self-reporting, subject to underreporting or misreporting; capture's one day's trip and does not account for variability across days	Necessary
Focus Groups	The World Bank Group (2010) Government of Canada (2018) Garrett (2014)	Offers qualitative data regarding the reasons behind travel decisions	Requires thoughtful sampling to ensure appropriate representation; subject to group think	Necessary
Surveys	The World Bank Group (2010) Government of Canada (2018) Garrett (2014)	Offers qualitative data regarding the reasons behind travel decisions	Based on self-reporting, subject to underreporting or misreporting; response rate concerns	Necessary

Informant Interviews	ACDI/VOCA (2012)	Can be conducted with a variety of stakeholders, including experts, key leaders, individuals, etc.; provide further insight	Can be expensive and time-intensive	Encouraged
GPS Analysis	Elango, Venthan, Guensler, Ogle (2007)	Provides quantitative picture of a person's travel habits which can be assessed over multiple days; Offers localized information that can be more specific than national trends; less underreporting compared to self-reporting tools	Relies on traveler to connect GPS; expensive	Encouraged
Evaluate how current road infrastructure is used differently by men and women				
Eval	Toolkit Source	Advantages	Considerations	Priority
Disaggregate data by gender	ACDI/VOCA (2012) AARP (2015) Asian Development Bank (2013) Polk (2003) The World Bank Group (2010) Government of Canada (2018) Garrett (2014)	This is the key method for understanding the differences between men and women travel patterns and road use	Some metrics may not be developed for disaggregation	Necessary
Evaluate road design	Asian Development Bank (2013)	Can determine gaps in access to safe travel routes; identifies characteristics that increase or decrease perception of safety	Ability to change physical depends on several external factors	Necessary

Travel Diaries	The World Bank Group (2010) Government of Canada (2018) Garrett (2014)	Provides picture of a person's travel habits over a 24-hour time period; offers quantitative and qualitative data regarding a person's travel modes	Based on self-reporting, subject to underreporting or misreporting; capture's one day's trip and does not account for variability across days	Necessary
Focus Groups	The World Bank Group (2010) Government of Canada (2018) Garrett (2014)	Offers qualitative data regarding the reasons behind travel decisions	Requires thoughtful sampling to ensure appropriate representation; subject to group think	Necessary
Surveys	The World Bank Group (2010) Government of Canada (2018) Garrett (2014)	Offers qualitative data regarding the reasons behind travel decisions	Based on self-reporting, subject to underreporting or misreporting; response rate concerns	Necessary
Informant Interviews	ACDI/VOCA (2012)	Can be conducted with a variety of stakeholders, including experts, key leaders, individuals, etc.; provide further insight	Can be expensive and time-intensive	Encouraged
Observations	ACDI/VOCA (2012)	Can be conducted anywhere, and can apply to both people and places; observations help assess body language in interviews and focus groups, as well as road design and physical spaces	Can be very subjective and difficult to measure	Encouraged
Census and Facility Data	AARP (2015)	Quantitative data to show how many people live within walking distance of	Does not show how, why, or if people actually use these facilities; assumes	Encouraged

		transit, bicycling, and walking facilities	people use the facilities nearest to them	
Identify opportunities to maximize gender benefits and reduce barriers				
Method	Toolkit Source	Advantages	Considerations	Priority
Report the differences in travel between men and women	ACDI/VOCA (2012) Asian Development Bank (2013) European Institute for Gender Equality (n.d.) Government of Canada (2016) The World Bank Group (2007)	Clarifies observations and key priorities; outlines the gaps and barriers clearly for groups to act upon	May not capture every gap and barrier; important to recognize this depends on the data collection and analysis	Necessary
Determine key access points that can be addressed	ACDI/VOCA (2012) Asian Development Bank (2013) European Institute for Gender Equality (n.d.) Government of Canada (2016) The World Bank Group (2007)	Outlines the priority areas that can be addressed first in looking at gender-based policies; develops preliminary list of resources to address barriers and gaps	Key access points and priorities will be determined based on the people involved in the assessment - it is important to have the right people in the room	Necessary
Identify stakeholders and agencies that can support recommendations	ACDI/VOCA (2012) Asian Development Bank (2013) European Institute for Gender Equality (n.d.) Government of Canada (2016) The World Bank Group (2007)	Helps begin resource identification; early stakeholder identification can help inform data analysis and data collection; stakeholders can assist with prioritizing barriers and gaps based on resources and need	Important to identify the right stakeholders who are able to contribute and participate in the gender analysis process	Necessary

Engage stakeholders to implement and enforce gender-based policies

Method	Toolkit Source	Advantages	Considerations	Priority
Validate research findings with stakeholders	ACDI/VOCA (2012)	Ensures that all partners understand one another fully; galvanizes support for recommendations/future policies; able to solicit feedback from stakeholders; helps identify resources to help meet recommendations	Can be time-intensive and expensive	Necessary
Use or create an organization that brings together stakeholders	Sweden Gender Equality Agency (2018) Government of Canada (2016) Polk (2003)	Central body is able to convene stakeholders; creates a clearinghouse for gender-based practices that all stakeholders can use and access; creates one-stop-shop	Requires training and staffing that may not exist; requires consistent, long-term funding	Encouraged
Train stakeholders on the importance of gender analysis and gender-based policies	Sweden Gender Equality Agency (2018) Government of Canada (2016) Polk (2003)	Stakeholders who understand the reasons behind gender analysis and gender-based regulations and policies are better able to uphold them and enact them; creates a better platform for information-sharing with all stakeholders communicating with the same language	Training does not guarantee adoption; training needs to be uniform and widespread which can take additional time and resources	Encouraged
Create continuous monitoring system				

Method	Toolkit Source	Advantages	Considerations	Priority
Identify output and outcome goals	Asian Development Bank (2013)	Clearly outlines what gender analysis is intended to accomplish in the specific setting; provides monitoring framework that multiple partners can reference	Different administrations and agencies may have different goals	Necessary
Use or create an organization that can enforce gender-based policies	Sweden Gender Equality Agency (2018) Government of Canada (2016) Polk (2003)	Central body is able to monitor policy implementation and results from gender-based analysis	Requires training and staffing that may not exist; requires consistent, long-term funding	Encouraged
Develop reporting system that regularly updates stakeholders	ACDI/VOCA (2012) Government of Canada (2018)	Maintains transparency about the gender analysis process; provides stakeholders with the latest progress; holds implementing agencies accountable	Requires central clearinghouse of information	Encouraged

Appendix B: Workshop Agenda and Participant List

A G E N D A

Reimagining Complete Streets for Everyone: Gender, Sustainable Development and the Arts

July 15, 2021, 8a–12p CT

Session 1: Gender, Inclusion, and the Mobility of Care

Purpose

To explore the ways that gender and strategies for social inclusion, sustainability, and the arts can increase the impact of Complete Streets. These perspectives help us to more accurately characterize mobility, transportation system performance, and the human experience of streets as public spaces. Thus, they allow us to optimize transportation strategies, increase equity, and more completely realize the potential of Complete Streets to foster wellbeing. Through our collaboration we will develop our skills to be transformative practitioners and leaders with the tools and approaches that we discover together in the process.

08:00-9:00

- Welcome
- Overview of Complete Streets for Everyone (the three-part series)
- Harnessing the full potential of Complete Streets
- Discussion with key questions

09:00 Introduction to Gender Analysis and Social Inclusion

09:15 Group Work Part A (Recommendations 1–5, Appendix A)

10:00 Brief Share of Group Work

10:15 Break

10:30 Group Work Part B (recommendations 6–10, Appendix B)

11:15 Brief Share of Group Work

11:30 Discussion and Next Steps

Preparation in advance

- [Background and readings](#)
- [Notes for workshop discussion](#)
- [Concepts and definitions](#)

Workshop participants, July 15, 2021

Alana Brasier	City of Tampa, Mobility Department
Amy Oeth	City of Milwaukee, Department of City Development
Arthi Rao	Georgia Institute of Technology
Carey McAndrews	UW–Madison
Cassandra Leopold	City of Pittsburgh
Catherine Ross	Georgia Institute of Technology
Daritza de los Santos	UW–Madison
Ebony Venson	Smart Growth America / National Complete Streets Coalition
Hans Purisch	UW–Madison
Ivy Hu	UW–Milwaukee
Joyce Tang Boyland	Alverno College
Kate Riordan	City of Milwaukee, Department of Public Works
Lori DiPrete Brown	UW–Madison, Global Health Institute, 4W
Melissa Seidl	Milwaukee Department of Health
Renee Callaway	City of Madison
Robert Schneider	UW–Milwaukee
Yicong Yang	UW–Madison
Yu Zhang	University of South Florida

