

The Pink Tax on Mobility: Opportunities for Innovation

February 2022



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Executive Summary

Transportation Has a “Pink Tax”: Women Pay More Than Men to Travel

The Pink Tax is a form of gender-based price discrimination concerning the upcharge womenⁱ pay for specific products or services. Although the term is most frequently referenced in regard to cosmetic and personal care products, it is also prevalent in transportation services. Women are three times as likely to be concerned for their safety on shared modes of transit, and as a result, choose longer, more costly, or less efficient transportation options. The physical and psychological impact of gender-based trauma can result in lifelong preferences for cars or taxis instead of transit or bikes. Moreover, 61% of caregivers are women; escorting children or the elderly further reduces travel options and adds costs.

This white paper is based on the conviction that innovations to increase personal safety and improve accessibility for caregivers will provide greater access to education and jobs, deliver health benefits from more active transportation, and support women’s confidence and well-being in trip planning—while greatly reducing carbon emissions.

With support from NYSERDA and Lyft, the workshop brought together diverse leaders from transportation, government, industry, research, investing, and advocacy. The purpose of the workshops was to draft this roadmap for research, development, and demonstration of technological solutions, with an emphasis on pragmatic innovations that can be tested in New York State within the next year and then scaled. The workshop participants will also be the seed group for a network of leaders and change-makers aimed at driving solutions and reshaping markets into the future.

ⁱ The term ‘woman’ as used in this report is inclusive of all female identifying individuals, including cis, trans, and female-presenting

In 2019, former Governor Andrew M. Cuomo signed into law the Climate Leadership and Community Protection Act (Climate Act), mandating that New York State’s power be 70% renewable by 2030 and 100% carbon-free by 2040, and in 2020, the New York Power Authority (NYPA) announced a \$250 million EVolve program to build out electric vehicle charging infrastructure across the state. These commitments will redefine mobility and energy services, but such impacts could be jeopardized if they fail to address the obstacles and fears women face daily on transportation. Understanding the Pink Tax and how to eliminate it is increasingly urgent during this transition to avoid unintended consequences around personal safety and gender equity.

Problem Definition and Root Causes

The sources and impact of—as well as potential solutions for—the Pink Tax are complex and far reaching. Disproportionate caregiver responsibilities and heightened concerns for personal safety reflect broader social issues, and the transportation inequities in turn reflect workplace policies and biases, criminal justice practices, and lasting infrastructure design issues. These long-standing challenges are further exacerbated by the global health pandemic and the national racial equity movement. Addressing the Pink Tax is more urgent than ever, and it is critical to start now.

Nationally, women comprise 61% of caregivers and are more likely to travel with strollers, wheelchairs, or groceries (AARP, 2020). Yet the design of most transportation options almost never takes this into account: bike share lacks baby seats; car share rarely offers car seats; many train stations lack elevators; fares are per person, not per party; trips with multiple stops are harder to plan; and so on.

The majority of women are concerned about their safety when using transit, especially late at night. Those with the means may opt for taxi, ride-hail, or private cars; other women may choose less direct routes, second-choice destinations, or forgo travel altogether. When sexual harassment or assault does occur, too often the incident is difficult to report, and the offender is not held accountable. Similarly, due to safety concerns, shared bikes are predominantly used by men, and women's use of bike share is more likely to depend on protected bike lanes. While policing, surveillance, and prosecution are an integral part of public safety, this effort focused more on proactive solutions such as station and bus stop design, measures to make off-peak and late-night travel safer, and data-forward processes to address the unique needs of university students and employees.

Key Areas Ripe for Innovation Now

Seven breakthrough concepts were identified from the workshop, as detailed at length on page 12. Not only are these ideas testable today, but the solutions could significantly change travel behaviors.

1. Incident reporting: simplify the reporting process and explore app-based services.

- 2. Shared micromobility designed for women's travel needs:** expand fleets with new designs to accommodate bags and packages, with deployment focused on off-peak and shorter range trips.
- 3. Inclusive trip planning:** account for safety considerations in trip planning software.
- 4. Station-specific applications:** engage local communities to crowdsource concerns and create custom-tailored solutions.
- 5. Gender audit tool:** include a gender-lens review to score transit projects moving forward.
- 6. Responsive lighting and accessible announcements:** ensure announcements are made in auditory and visual form to improve safety and usability for people with disabilities.
- 7. Family fares:** develop a singular payment option for families to ease cost burdens for caregivers.

This white paper—and the workshops described herein—is an initial step in building more equitable systems. It is intended to frame the issue for various stakeholders, lay the foundation for systemic change, and gather momentum by identifying high-impact near-term interventions.

The Pink Tax on Mobility: Context, Causes, and Effects

Existing Research: Inclusive Design Opportunities for Women's Travel Needs

A brief literature review underscores both the need for more knowledge about the Pink Tax on Mobility and the opportunity for far-reaching transformation based on gender equity.

New York University's Rudin Center for Transportation Policy and Management's 2018 report, *The Pink Tax on Transportation*, provided the starting point for this work. They found women are three times as likely to be concerned for their safety on transit (Kaufman et al., 2018). To travel safely, they may pass up job opportunities in certain areas, choose lower quality schools, or spend more time and money for on-demand transportation; the result can be a lifetime of lower earnings and higher spending (Borker, 2018). Sexual assault and harassment on public transit is prevalent, and victims report decreased transit usage, although the exact decrease has not been effectively quantified (Kash, 2019). Furthermore, nearly 53 million Americans provide unpaid care to a child or adult, and these caregivers are disproportionately women. Data about caregiver travel patterns are scarce, but it is clear that transportation options would be more limited when the recipients themselves have mobility issues (AARP, 2020).

Safety and caregiving challenges often push women towards transportation modes that are less sustainable and energy efficient. Nationally, cycling commute frequency stands at 23% for women, relative to 75% for men (Transportation Research Board, 2004). This is consistent with findings concerning Citi Bike utilization in New York City, as shown in Figure 1. In contrast, women are 25% more likely to use a taxi each week (Morning Consult, 2018). Despite gender-based differences in travel behavior, transportation data rare-

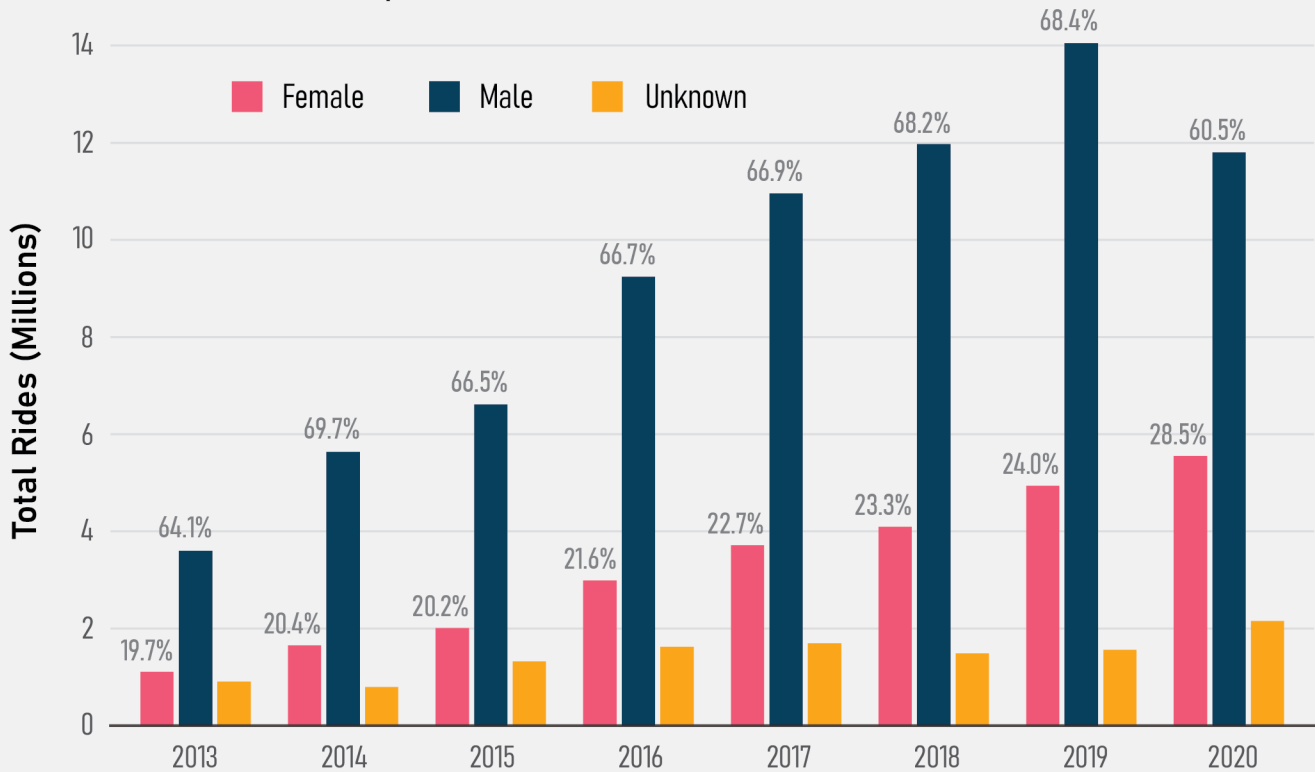
ly disaggregate gender. The discoveries from such data could be invaluable in understanding the Pink Tax. For example, one study in *Nature* utilized mobile phone data and found that in Santiago, Chile, women tend to exhibit reduced mobility, visiting fewer and more localized locations than men, which they note "might result from the interplay of cultural, infrastructure, resource, and safety constraints" (Gauvin et al., 2020).

While women comprise more than half of riders, and in many cases are the fastest growing demographic segment, transportation agencies do not routinely assess women's travel patterns. In fact, the LA Metro may have the only such comprehensive assessment in the United States. They found that women are more likely than men to: trip-chain or not travel at all; travel mid-day and with children; alter or avoid trips due to concerns for safety; and have difficulty traveling with strollers or shopping carts (LA Metro, 2019).

In recent years, venture capitalists have invested more than \$70 billion in mobility innovations (Gaprindashvili, 2018), but few investment committees include women, thus missing potential improvements that would address women's travel needs (Olsen, 2018). For example, women are much less comfortable and trusting than men about riding in autonomous vehicles, which may affect their market capture (AAA, 2019). Moreover, electric vehicle (EV) adoption programs have emphasized fleets, in part because deploying EVs to highly trafficked ride-hailing fleets can achieve three times the emissions reductions of private adoption of EVs (Jenn, 2019). However, little has been published about gender-neutral charging station design (e.g., security at airport EV taxi waiting/charging areas).

Figure 1. Citi Bike Ridership in New York City by Sex

Although Citi Bike ridership has grown overall, females continue to make up only a small fraction of total trips.



SOURCE: CITI BIKE TRIP HISTORY DATA

THE PINK TAX ON MOBILITY

An online survey focusing on changes in travel trends during the COVID-19 crisis was administered by C2SMART University Transportation Center at New York University from July to October 2020. The objective of the survey was to identify how different populations' travel was affected by the COVID-19 pandemic, including women, people with disabilities, low-income households, and seniors. The survey aimed to investigate whether the crisis had magnified the mobility disparities for these populations.

In total, 1978 responses were collected: 38% of the respondents self-reported as female, 27% of the respondents identified as living with a disability, and 13% reported living in a low-income household (earning less than \$50,000/year).

Preliminary results from the survey revealed that 32% of women reported having less time for themselves after doing household chores during the COVID-19 stay-at-home period as compared to before the pandemic; this number is only 8% for men. For caregiver trips with dependent children or adults, 45% of the female respondents reported that they still had to take such trips during the pandemic, compared to 28% for male respondents. In addition, women reported they had to take more caregiver trips than before (31%), whereas most men (76%) reported taking the same or fewer such trips. This disproportionate impact reveals an additional Pink Tax on transportation exacerbated by the COVID-19 crisis.

Areas of Focus – Caregiver Accessibility and Personal Safety

The workshop used the literature review cited above as a starting point and further expanded on the complexities and effects of each root cause. During the discussion, 28 specific pain points related to caregiver accessibility and 24 related to personal safety were identified, each within five areas of interest: micromobility, school-related travel, traveling with disabilities, off-peak travel, and station design and infrastructure. These pain points, described in detail below, were the foundation on which innovative solutions and breakthrough concepts were suggested.

Micromobility

Micromobility refers to the variety of transportation options for shorter trips (under three miles). In New York, these options primarily include walking, biking or bike share, e-scooters, and e-bikes or mopeds. Only 24% of U.S. bike trips are made by women, and similar differences in gender-based usage hold true, for the other micromobility options (Bliss, 2019). Addressing women's travel needs presents a tremendous market opportunity to attract new customers.

Notably, women and caregivers are not always included in the development of products, resulting in imperfect sizing (e.g., bicycle seat heights and shapes) that may not be right for a wide range of builds. The vast majority of micromobility options are typically designed to accommodate a single, able-bodied person. Baskets and sidecars, while not sized for children and only support a certain weight threshold, may be used to transport children, which is dangerous. Longer trips and routes with hills or bridges can be more exhausting with passengers.

Furthermore, shared micromobility options used for first/last mile transfers are an added expense to public transit that can be unaffordable to the most vulnerable populations. A caregiver from the Bronx must com-

mute far distances often late at night, and multi-modal trips may be prohibitively expensive. In particular, nighttime commutes are daunting and potentially more dangerous, leading people away from micromobility options. Moreover, micromobility is not always located where people need them (e.g., proximate to trains or to areas that are specifically relied on for last mile trips).

School-Related Travel

Bringing children to and from school and after-school programs adds trips, miles, and time to caregivers' travel. In addition, public transit vehicles and facilities are not designed for chaperone travel. There is rarely space for strollers, wheelchairs, and other mobility devices, and most modes require strollers to be collapsed. Per-person fares add both cost and inconvenience, requiring payment for multiple fares. Entry points, such as narrow turnstiles, rarely accommodate strollers or even children with large backpacks.

For working parents or those in school, schedules can be strict and rarely offer flexibility for last-minute changes in travel patterns. Concerns about consistency and reliability of service lead travelers to pad their schedules or to pay extra for more reliable modes. For students in higher education, transit service schedules rarely match academic schedules; for example, off-hour trips to and from the library might require a long wait for the bus, combined with substantial first and last mile gaps if routes are not convenient for accessing schools.


Traveling with Disabilities

The Americans with Disabilities Act (ADA) was passed more than 30 years ago. However, transportation still often remains inaccessible for those with disabilities. The disabled community is a diverse group of people with a wide range of needs, including those limited in vision, hearing, cognition, behavior, and mobility. It is expected that transportation services accommodate this range of


needs, not only through physical access, but also through multiple channels of communicated information that allow all passengers to maneuver through the system without difficulty, yet this is seldom the reality.

Because caregiver travel falls disproportionately on women, so does the impact of inaccessible systems. Vertical access is a major obstacle in underground or elevated transit systems where elevators and escalators are frequently out of service or nonexistent. Communication of these outages and other critical information about travel plan-

ning and disruptions is often insufficient, late, or not accessible to individuals with visual or auditory impairments. Furthermore, vehicles and stations lack designs that can adapt to multiple users and diverse needs (e.g., grab bars at all heights or accessible seating for multiple individuals, such as a parent with a stroller and a person in a wheelchair). As is often the case, carrying out such improvements would likely result in a wave of benefits that support not only the disabled community but also caregivers and the general population at large.



I was on my way to work on the morning of April 11th, 2019 around 8:50 am. On the downtown 4/5 train at Union Square, I was forcibly touched shortly upon boarding the crowded train. I didn't know what to do. The perpetrator exited the train before the train left the station, so when I got off at Bowling Green I looked for the train conductor but couldn't find anyone. I was also unable to locate anyone on either the downtown or uptown platform to whom I could report the situation. I went to my office and told my supervisor what happened and we went together to find out where we should report the incident. We went to Union Square, where the incident occurred, and ran into an MTA worker who my supervisor knew; he showed us the way to the police station in the subway station. We asked to report a sexual assault; the officer at the front desk asked me some questions in the open and then asked me to write up the incident. He directed me to a female officer who handed me a paper with questions, which I filled out. My supervisor insisted there be a walk through at the station and after some resistance, we finally convinced an officer to walk with us to the platform. I showed him where the event took place and he showed us where the platform cameras were. We returned to the police office and waited for police officers to arrive at the station and further assist us. It was unclear what was going to happen. All told, we were at the Union Square station for an hour. Eventually, the officers picked us up from Union Square in a car and drove us to the Special Victims Unit (SVU) office in downtown Brooklyn. The office was a 10-minute walk from the subway. We waited to be seen and went into a (non-sound proof) room to report the incident and respond to detailed questions. I filled out another questionnaire and looked through a database of previous offenders; I was not able to identify the person. The detective explained he would review the camera archives and next steps. We were at the SVU office for over an hour. The reporting process was quite time-consuming, exhausting, and stressful.



–Personal account shared as part of the workshop presentations

Off-Peak Travel

Women are more likely to travel off-peak, generally late at night or midday. Off-peak transit schedules can be prolonged, less frequent, less reliable, and prone to service cuts. Waiting at bus stops or in subway stations late at night, especially when there is a long wait, can be confusing or formidable. The sparse ridership portends a lack of bystander assistance. In parts of the subways, a lack of WiFi or cellular service can make it hard to get help or report incidents.

Reporting incidents is a major challenge for victims, especially for more unaccustomed individuals such as tourists and non-English speakers. Reporting transit harassment or assault is onerous: locating and flagging down law enforcement, providing an accurate description of the perpetrator, and having to relive the incident multiple times can be time-consuming and stressful (as conveyed by the personal account shared in the call out box above). In the end, it is unlikely the perpetrator will be captured before the train departs, if at all. As a result, victims will often not report given traumatic prior experiences with law enforcement, systematic fears of dis-

crimination and racial bias, or lack of awareness about the process or confidence that it will result in anything.

Station Design and Infrastructure

Many of the above challenges are only exacerbated by station and transit designs that are not conducive to accessibility and safety. For example, many bus stops and subway platforms lack sufficient lighting to make women feel safe, especially during off-peak hours when there are fewer people nearby. Some underground stations also have dark winding tunnels, corners, and hidden nooks whereby incidents would be out of sight to passersby and station personnel. Moreover, on top of their chief accessibility concerns with the dearth of working elevators, disabled individuals are also at heightened risk in poorly designed stations. Visually impaired individuals may find it difficult to navigate subway stations that are dark or have few contrasting colors, and help-point kiosks may be difficult to locate or use. Similarly, bus stops that remain uncleared from snow or litter present regular accessibility problems.

Workshop Goals and Outputs

Workshop Goals and Format

To expand the frame of reference and expertise within this roadmap, the project steering committee convened a diverse group of leaders and innovators for a three-part virtual workshop series. The main objectives of the series were to frame the issue for multiple stakeholders, lay the foundation for systemic change, and gather momentum by identifying high-impact, near-term interventions. The workshops were highly interactive, with input gathered in advance by survey, ideas discussed through facilitated breakout groups, and concepts evolved during and between sessions. More than 400 hours of planning and participation went into the workshops.

The workshop approach was codesigned by a multi-stakeholder steering committee with input from each participant in an inclusive co-creation process. Prior to the first workshop, participants completed a survey about their prior understanding of the Pink Tax, initial insight into potential solutions, and roles they play in the ecosystem. Each individual also participated in a briefing to answer questions they had about the project, get their suggestions on how to focus and structure the workshops, and identify specific areas for their attention during the sessions. Participants were sent reading materials as preparation for the workshop discussions.

Based on this prework, the first two sessions focused fairly narrowly on specific aspects that are more amenable to immediate innovation: caregiver accessibility (school-related travel, chaperoning seniors and those with disabilities, and micromobility options) and personal safety (station design, off-peak and essential worker travel, and university access). Closed captioning and American Sign Language interpretation was included. Breakout groups were pre-assigned and facilitated by leaders appointed by the steering committee. Struc-

tured virtual white boards were shared for real-time note-taking. The third session focused on identifying actionable solutions, ending with a pitch event with ad hoc teams sharing the top ideas.

In addition to the planning team, 21 individuals volunteered to facilitate breakouts. They participated in preparation sessions, employed the shared virtual whiteboards for note-taking, led discussion, and documented the ideas discussed.

The first session was held on Thursday, September 24, 2020, and focused on caregiver accessibility. Sarah Kaufman of the NYU Rudin Center presented the plan for the workshop series and a high-level view of the problem. Christine Serdjenian Yearwood, founder of Upstand, presented an entrepreneurial perspective on how to begin using market forces to address the issue. Breakout groups explored the challenges of traveling as a caregiver and started to surface innovative approaches.

The second session was held on Friday, September 25, 2020, and focused on personal safety. Melissa Hart, founder of eBodyGuard, was the moderator. Sarah Meyer, chief customer officer of the MTA, and Sheila Binesh, transportation planner at Permanent Citizens Advisory Committee to the MTA, presented NYC Transit's current programs. Meghna Khanna, senior director of mobility corridors at Los Angeles Metro, presented a summary of the agency's women's travel needs assessment. Breakout groups explored the impact of personal safety concerns on travel behavior and brainstormed solutions associated with specific travel personas.

The third session was held on Wednesday, September 30, 2020, and was focused on developing implementable ideas from the earlier sessions. In advance, all participants received a digest of the earlier workshops

and selected one potential solution to carry forward. Alexander Shermansong of Civic Consulting USA presented a post-workshop action plan; Rachel Haot, executive director of the Transit Innovation Partnership, presented a technology demonstration framework; and New York City Council Member Helen Rosenthal shared insight into how to catalyze systemic change. Five breakout groups were created, each with the mission to select one innovative solution to develop further and identify concrete steps to test and scale it. The approach sought to carry forth predetermined goals to material outcomes.

Workshop Participants

More than 65 individuals participated in these workshops from 45 different organizations, including the transportation industry, universities, national labs, advocacy groups, law enforcement, housing authorities, venture capital companies, and philanthropists. The full list of organizations can be found below. Moreover, Figure 2 shows the self-reported demographic breakdown of the participants by gender, race, years of professional experience, and organization type.

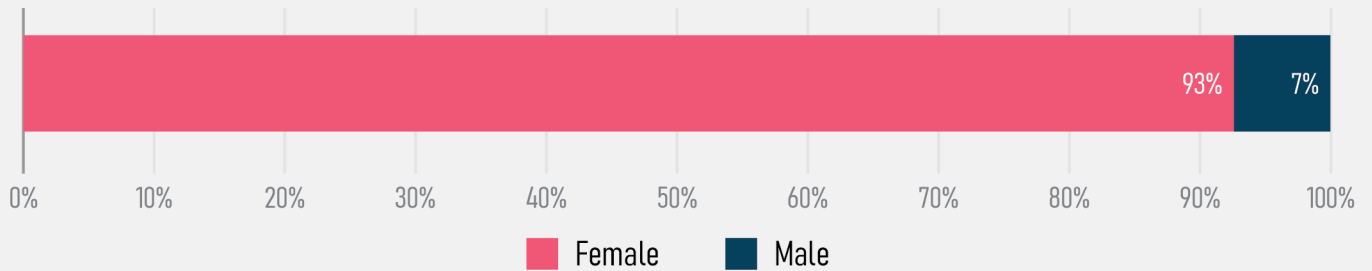
Workshop Participant Organizations

- Buffalo Niagara Medical Center
- Carnegie Mellon University
- Center for Community Transportation
- City Buildher LLC
- Civic Consulting USA
- Cubic Corporation
- Dallas Fort Worth International Airport
- eBodyguard
- Enterprise Community Partners
- First 5 LA
- Fu Wilmers Architects
- Gingerbread Capital
- GOBike
- GO Buffalo Niagara
- Greater Buffalo Niagara Regional Transportation Council
- Harlem Independent Living Center
- International Nighttime Design Initiative (NTD)
- Kings County District Attorney's Office
- LA Metro
- Lawrence Berkeley National Laboratory
- Mobility Corridors
- National Renewable Energy Lab (NREL)
- NYC City Council
- NYC DOT
- NYCEDC
- NYC Mayor's Office for People with Disabilities
- NYC Response Lab
- NYC Transit
- NYSERDA
- NYU C2SMART Transportation Center
- NYU Rudin Center for Transportation
- Reddy Bikeshare
- Republic/Capalino and Company
- Riders Alliance
- Secret Garden
- Straphangers Campaign
- SUNY - Buffalo
- The New York Women's Foundation
- TransitCenter
- Transit Innovation Partnership
- Transportation Alternatives
- Uber
- UP-STAND
- Via Transportation Inc.
- Women.NYC

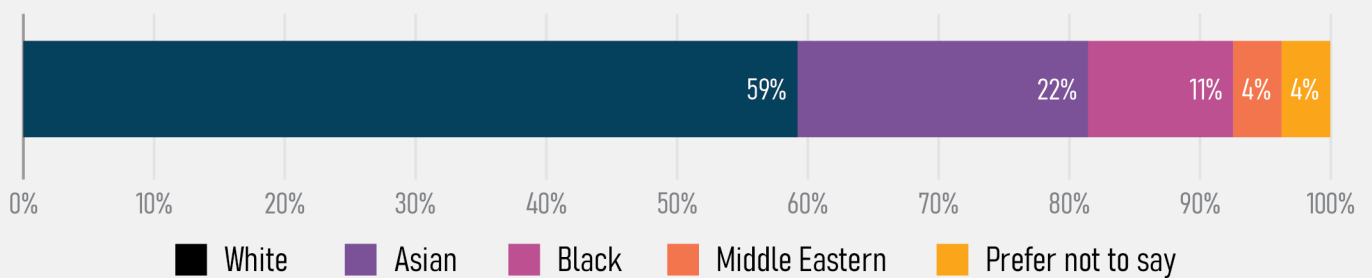
Figure 2. Demographic Breakdown of Workshop Participants

Self-reported by participants who completed the pre-workshop survey (n = 27)

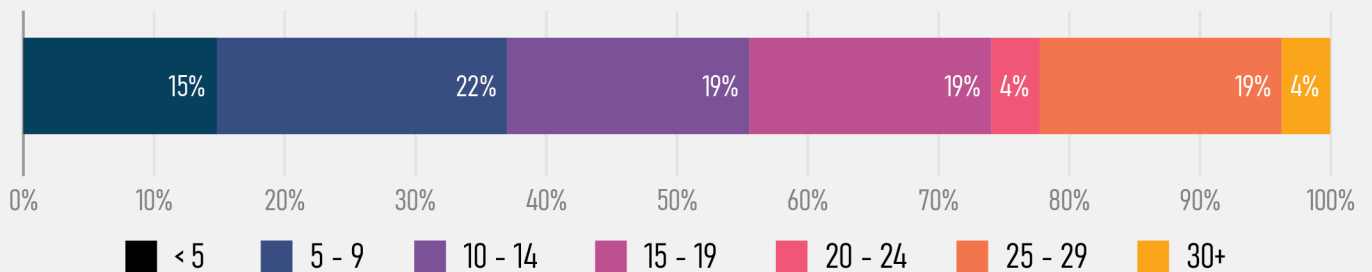
Gender Identity



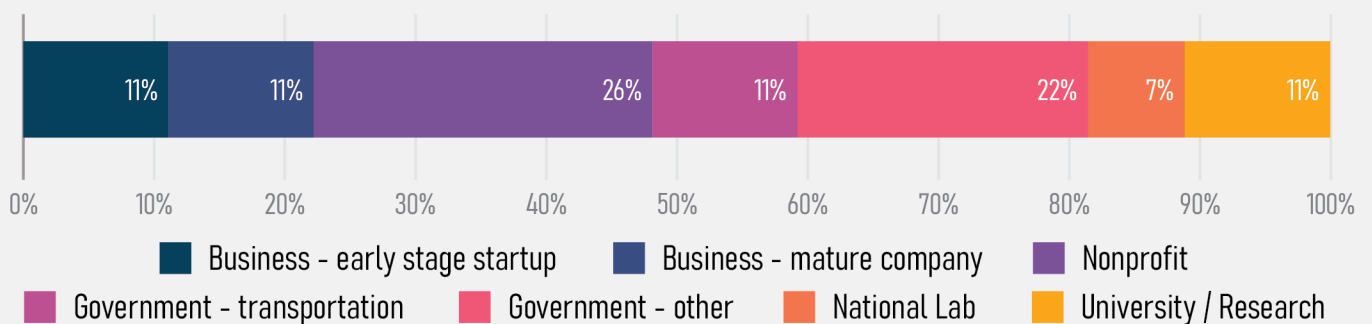
Race



Years of Professional Experience



Organization Type



SOURCE: PINK TAX ON MOBILITY PRE-WORKSHOP SURVEY

THE PINK TAX ON MOBILITY

Workshop Output

The workshops identified nearly 70 potential solutions, from child seats for bike share, to smart lighting in transit stations, to bystander intervention apps. The following list is a selection of the solutions considered:

- Modular designs for buses and trains to make seats more flexible/adaptable (e.g., to accommodate strollers and wheelchairs)
- An anti-harassment public information campaign, including messaging from leaders, place-based ads, signs, and announcements
- An app to support walking school buses that would streamline chaperone travel needs for elementary schools
- A universal platform to find multiple first/last-mile options, including ride-hail
- A clearinghouse for gender-mainstreamed design to promote a broader understanding of women's travel needs (e.g., bike lanes and the inclusion of a child sidecar for bike share, safe stations for transit, etc.)
- A university-oriented bike share, including hyper-local partners and special pricing
- Design standards and incentives (like LEED) for addressing women's travel needs
- Universal wayfinding/service announcements to increase ease of access and independent travel (including for the visually impaired and hearing impaired)
- A bike train app to connect people willing to ride in groups for safety in numbers
- A secure bike parking network
- Multi-modal fares, including transit and micromobility (and public subsidies to expand availability)
- An app for more convenient and less traumatic incident reporting

These solutions have the potential to enable cities, communities, and regions across New York State to move toward more inclusive economic development and equitable climate action, with energy-efficient mobility

opportunities and partnerships that reduce safety risks, costs, and environmental impacts. Moreover, they seek to leverage data and emerging societal trends in ways that more broadly inform investments in safe, reliable, adaptable, sustainable, smart, accessible, affordable, inclusive, and clean transportation choices. Several of these ideas are further developed, as part of a proposed innovation and demonstration program (see next section).

"All of the ideas seemed to interrelate and could build on each other," one participant noted. "For example, an ad campaign about 'See Something Say Something' easily coordinates with ensuring all communications are accessible in multiple formats—audio, visual, electronic, in station, outside of station, etc."

"I appreciated the final session, which I thought was facilitated very well," another participant said. "This experience highlighted the amount of knowledge involved in this session and the huge amount of expertise and insight in the virtual room."

Selection of potential solutions was based upon two initial criteria: potential impact and the feasibility of implementation. Additional review criteria for further advancement might include: replicability, scalability, and implications for sustainability; community engagement to ensure concepts align with local priorities, aspirations, and ownership to advance (the concept inspires action); and a broader inclusion of new voices that promote equality and empowerment of women, youth, and vulnerable, disadvantaged, or marginalized groups.

Breakthrough Concepts

Workshop participants were assigned to several breakout rooms, which aligned with the goals of each session. Groups were tasked with brainstorming ideas that could address high-impact transportation solutions for women's safety and caregiver issues. This included participants working together to identify and craft clear challenge or problem statements. Participants then turned their attention to improving understanding of the context- and scale-specific nature of the solutions and breakthrough concepts. Designated facilitators from NYU and other institutions led the sessions to generate an initial list of ideas that could be suitable for NYSERDA or other organization-led investments.

As the workshop moved from exploring the problem to brainstorming solutions, participants highlighted 23 specific ideas that would make a significant impact on caregiver accessibility, personal safety, or both—while also being testable in the next 12-18 months. In some cases, certain ideas were noted as important but not necessarily well suited to these guidelines. In other cases, certain problem areas or ideas were noted as promising, but the group did not have sufficient time to explore specific details or ideas. While the workshops highlighted important policy, infrastructure, finance, and system issues, we focused more deeply on technology and data opportunities, since these are more amenable both to testing in the near term and scaling if proven effective.

Questions identified by the workshop organizers and breakout facilitators were used to brainstorm, discuss, and challenge conventional wisdom. These included:

- What are key lived experiences? Do you have any personal, real-world stories?
- What are three specific pain points and up to five related solutions on this topic?

- What have you seen implemented to solve these problems that could have been done better?
- What have other cities, places, and agencies implemented that you feel have been effective?
- What would we need to make breakthrough concept design and implementation easier, faster, cheaper, and better for all?
- If money was no issue, and removing all other barriers, what are some idealized solutions that could have the highest impact? Might this be feasible? What is the most important barrier?

The following ideas were identified in response to these questions and as breakthrough opportunities either in the third workshop or in the subsequent survey and discussion:

1. Incident reporting
2. Shared micromobility designed for women's travel needs
3. Inclusive trip planning
4. Station-specific applications
5. Gender audit tool
6. Responsive lighting and accessible announcements
7. Family fares

In most cases, integration and synthesis of notes on ideas by breakout participants, facilitators, and the workshop organizing team made the ideas shared in the recap sessions and in this report stronger. These not-yet-final ideas are summarized below by the workshop goals or topics, with each including a description of a key challenge, problem context, and potential solution. A next phase could include identifying the ideal state or outcomes if the concept was implemented, barriers preventing that ideal state, and additional resources to help overcome those barriers.

1. Incident Reporting

Challenge

How can we make sexual harassment, assaults, and robberies easier to report and prosecute?

Context

Complicated, time consuming, and degrading reporting processes can revictimize women and cause incidents to go unreported. Connectivity challenges can make incidents difficult to report by phone in tunnels or on the subway, also limiting potential reporting by bystanders. Even reported incidents may not lead to successful prosecution, due to the difficulties of catching, identifying, and prosecuting, allowing perpetrators to offend again.

Potential solutions

Several new text-based and app-based reporting systems include images, recordings, locations, and other data. Tokyo Metro, for example, offers an anti-groping app to blare calls for help. The technology must work for victims, law enforcement, and bystanders, and wherever people are traveling, including tunnels.

Promising concepts could be demonstrated on specific routes, at specific stations, or with a university partner. Considerations include providing an incident record to the victim at the time of the report and offering SVU officers to come to the location of the victim's choosing to report incidents with an option to walk through the incident location. Some private sector models might develop products for law enforcement, transit agencies, universities, or individuals. Transit officials could also conduct interviews and surveys about rider experiences with sexual misconduct and perceptions of safety to capture approximately how many incidents go unreported; survey results should be posted publicly for informed and transparent policy action.

2. Shared Micromobility Designed for Women's Travel Needs

Challenge

How might shared micromobility meet the needs equally of riders of all genders?

Context

Shared micromobility options—including bikes, e-bikes, and e-scooters—are used mostly by men. Vehicle design, fare structures, station and vehicle deployment, and street infrastructure do not account for women's safety concerns at night, or for multi-modal caregiver trips (e.g., to school, medical appointments, grocery shopping, etc.)

Potential solutions

New York City and the MTA are each considering shared e-scooter deployments. New vehicle designs could provide better accommodations for bags and packages and better balance (e.g., scooters with seats, baskets, and wide tires). Bikeshare with child seats, tandem bikes, or sidecars, as well as bike shares usable by children, may further open up micromobility to caregivers. Deployment could be multi-modal in terms of fare structure, placement near transit, or authorization of vehicles on transit. Policies can be implemented to promote safety by requiring protected bike lanes and better lighting.

3. Inclusive Trip Planning

Challenge

How might trip-planning apps help streamline trip-chaining, caregiver travel, and safety?

Context

Trip planning software tends to be origin-destination specific and focused on a single traveler, but women are more likely to take multiple shorter connected trips,

like bringing children to school, then traveling to work or running errands on the way home. Apps like Google Maps reflect traffic, street design, and mode choice, but not personal safety.

Potential solutions

New data related to trip purpose, companions, safety concerns, assumption of parcels (as from the grocery store), and caregiver accessibility could be reflected in routes. Potential solutions could be tested at primary schools with parents, employers, or in a specific community or corridor. For example, a woman taking transit at night might select a route that is heavily trafficked with a short walk on only well-lit streets. This could be framed similar to Google Maps' Accessible Places feature that will customize routes and suggestions to help wheelchair users find accessible places, transit routes, and walking directions.

4. Station-Specific Applications

Challenge

How can communities be supported to design their own solutions around specific stations or routes?

Context

Community groups, neighborhood associations, parent associations, business improvement districts, and others often create custom-tailored solutions, such as safe space signage, volunteer chaperones, walking school buses, and group bike rides. However, these communities may lack tools or resources to leverage technology easily.

Potential solutions

Applications or data services could focus on community engagement around transportation. Crowdsourced mapping, discussion forums, and other democratizing

technologies could help with late-night resources or safe spaces. Matching software could connect volunteers or ambassadors to specific station or route volunteer needs. Training could be delivered virtually to help community members de-escalate situations, establish standard response protocols, or understand various travel needs.

5. Gender Audit Tool

Challenge

How can women's needs shape new policies and mobility innovations?

Context

While environmental impact studies provide detailed assessments for major projects, similar standards do not exist for reporting gender impact. Furthermore, the underrepresentation of women at the leadership level of transit and planning organizations results in inadequate accommodation for the range of experiences and issues women face.

Potential solutions

Data standards or applications could make it easier for planners and innovators to incorporate gender-disaggregated data or even use checklists to provide women's needs for different types of projects (like LEED from the U.S. Green Building Council). Such a tool would measure gender-inclusion as a core planning consideration, rather than an afterthought. In addition, women-run companies and technologies would be considered key during procurement efforts. Lessons from existing tools in Vienna, London, and Los Angeles could shape the approach. Similarly, technologies like LiDAR scanning could be used to help score built-environment lighting, accessibility and safety levels.

6. Responsive Lighting and Accessible Announcements

Challenge

How can announcements and lighting be more responsive to travelers' unique needs?

Context

The disabled community encompasses a wide range of needs and impairments, and transit stations should be designed with multiple forms of communication to ensure all users have access to the same information. Accessibility implementations are beneficial not only to people with disabilities but often help everyone. For example, visual cues are valuable in subway systems that can be overwhelmingly loud or where riders are wearing headphones.

Potential solutions

Most U.S. subway systems have built-in visual and auditory cues for subway arrivals. For example, in Washington, DC, lights embedded in the platform flash to indicate when a train is approaching, and Chicago's El announces on which side train doors are opening. Such innovations make these systems more accessible to visually or auditorily impaired users. In addition, transit agencies can install brighter lighting, platform markings indicating conductor cars, and multilingual resources that will improve the experience for all riders.

7. Family Fares

Challenge

How can fares and payment technologies make it easier for families to travel together?

Context

Going through the turnstile requires payment for each adult and child. For families with young children, this burdensome process may require caregivers to send a child around to open the emergency door for strollers or acquire the assistance of a stranger. The faster a family can go through the gate, the safer they are.

Potential solutions

To adapt payment systems and policies for caregivers and families, transit agencies can develop family fares that allow for a singular payment for the family. Technologies like smartphones, tap-to-pay, or specialized fare cards can be used to simplify the process. For fare infrastructure, entering subway stations with strollers presents a major barrier. If turnstiles were replaced by wider gates for family and wheelchair access, and elevators were built and maintained throughout the system, barriers to entry would be significantly reduced for families, people with disabilities, and the broader population.

Aligning Survey Results

Key pre- and post-workshop results from the participant surveys are shared below. These results can be used to inform future data analyses and modeling individual and societal benefits in the context of mobility, accessibility, energy, emissions, and other co-benefits. These preliminary results might also help to inform future selection criteria for prioritizing future workshops, investments, analyses, and risk mitigation.

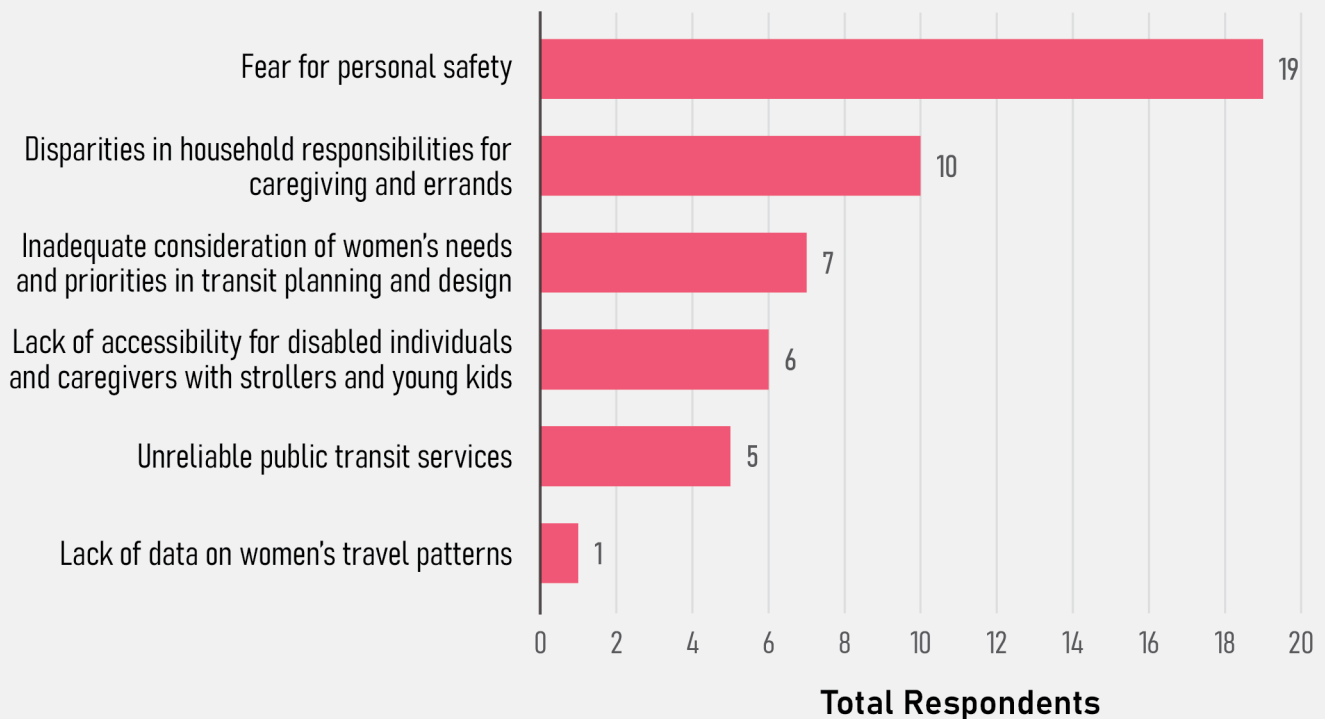
1. Impacts of the Pink Tax on Individual Travel Choices

Survey respondents detailed the extent to which the Pink Tax impacted their travel patterns and under

what circumstances these considerations were front-of-mind. Many responses emphasized the added cost and time spent on transportation for women who are largely responsible for household errands and caregiving for children (e.g., transporting children to and from school, appointments, and events). Some expressed their perception that any mode other than single-occupancy vehicles are infeasible with young children. Many responses also identified off-peak hours, especially late at night, as the times when women are most likely to spend more time and money on travel in an attempt to better assure their personal safety. This often involved taking a for-hire vehicle instead of transit or walking alone at night, avoiding sparsely populated subway cars,

Figure 3. Most Significant Causes of the Pink Tax on Mobility

Self-reported by participants who completed the pre-workshop survey (n = 27)



SOURCE: PINK TAX ON MOBILITY POST-WORKSHOP SURVEY

THE PINK TAX ON MOBILITY

and walking on well-lit streets with more pedestrian activity. This decision-making presents lost job opportunities for women seeking shift work, and disrupts social situations as some individuals indicated they would choose to not attend late-night events or leave early with a friend to reinforce their feelings of safety. One individual noted that women would feel pressured to live in more walkable/bikeable neighborhoods that are closer to their daily needs despite a considerably higher expense. Finally, several respondents discussed accessibility concerns, having to plan around what would be accessible to strollers or wheelchairs, and dreading situations where there was only one accessible space on a subway/bus.

Figure 3 shows the participants' perceived most significant causes of the Pink Tax.

2. Data Needed to Better Understand and Address the Pink Tax

Survey respondents were also asked to detail what data they would like to see collected and analyzed to support their anecdotal experiences and quantify the problem. Besides robust quantitative measures, respondents also hope to see future research include interviews and focus groups to collect more thorough qualitative data from diverse groups.

Quantitative Data:

- A comprehensive assessment of total trips taken by various demographics (e.g., income, race, gender, age), the length of each trip, and the total cost. This was mentioned by many respondents in an attempt to add statistical measures to the concept of trip-chaining.
- An overview of mode choices by gender and hour of day. Similar to above, this would allow researchers to quantify the extent to which women shift away from certain modes of transportation at night or in other off-peak hours.

- An analysis of transportation challenges and barriers to employment. Can we say with statistical significance that the Pink Tax impacts job opportunities, and quantify the potential pay lost?
- A review of spatial incident and crime data. Although this information would be beneficial in mapping out the locations where most incidents occur, it could be difficult to collect since many incidents go unreported.
- The economic costs beyond the individual level. Aggregated to an entire city, state or country, to what extent do individual externalities, carbon costs, and time costs add up? This could raise awareness of the Pink Tax and encourage policy makers to better address the problem.

Qualitative Data:

- Would women choose a different mode at night if they had a personal safety app, crime deterrent, or other tool that would give them greater assurance of their safety on public transit? What do they think is available or should be developed to make them feel comfortable?
- What would make women feel safe cycling in New York City and other urban areas across New York State? What about biking with children? How can we better understand the relationship between women and risk/uncertainty that makes them less likely to cycle in the city?
- Acknowledging the intersectionality of the Pink Tax, what are the experiences of transgender and non-binary individuals, BIPOC women, those with disabilities, or low-income women? With the recent rise in anti-Asian hate crimes, especially on the subway, intersectional identities are increasingly at the forefront of personal safety fears.
- Are safety concerns rooted more in the actual travel modes, in the first/last mile connections, or both?
- To what extent do women choose where to live based on their Pink Tax travel concerns?

Preliminary Data Analysis and Energy Modeling

This section offers an initial assessment of energy impacts and potential energy and emissions-related performance metrics. It presents a framework for measuring or estimating the potential impacts of implementation pathways. Such analyses can help to test new concepts to determine what are priority metrics, and how those metrics should be weighted in different communities for accelerating planning and decision-making on pathways forward.

Original Model

Addressing the Pink Tax has the potential to reduce statewide greenhouse gas emissions 3% to 15%—up to 7.1 million metric tons of carbon dioxide equivalent (MMt-CO₂e)—based on New York State’s 2016 greenhouse gas inventory for transportation emissions related to gasoline-powered vehicle miles traveled (VMT). This would be achieved by encouraging: more efficient travel behaviors; mode shifting toward public, shared, or non-motorized options; and lower-emission fuel and vehicle choices. Initial first-order modeling for a daily one-way commute of 10 miles in an urban area outside New York City estimates annual savings of at least \$500 in fuel costs alone (based on a model of statewide emissions with defined sectors and strategies, such as public transportation or ride-hail).

To provide more nuanced estimates of benefits, future research could develop a demographic-centered approach for scenario modeling. For example, changes in commuting might impact 25% of vehicle trips and 30% of VMT and enhanced accessibility could affect an estimated 70% of people with disabilities.

The model would also include U.S. Census Longitudinal Employer-Household Dynamics (LEHD) data on employment clusters and origin-destination pairs, travel surveys, data from app-based services, fuel economy statistics, current mode split statistics, and projected adop-

tion rates for different forms of mobility. For example, census block data at increasing distances from centers of employment could be used to model VMT and emissions changes as a percentage of all commute trips in certain modes or by those prioritizing safety due to late night shifts. Scenarios could be modeled for various State employment clusters, universities, cities, regions, or other contexts. One scenario to achieve 15% emissions savings might involve: 2% higher uptake of public transit due to increased caregiver accessibility; 2% higher uptake of EVs given greater safety at public charging stations; 2% higher level of shared mobility if pooling were considered safer; 5% higher uptake of shared, electric, and micromobility services replacing future vehicle purchases; and 6% higher uptake of walking, biking, and electric micromobility given increased safety and caregiver design.

Co-Design of Future Scenarios

Scenarios were informed by, and a part of, the following workshop-identified research questions, which could also inform future scenario and sensitivity analyses in a gender-sensitive mobility behavior model:

- What is the energy impact of fewer car trips if safety concerns on transit were addressed?
- What is the energy impact of increased bike share trips, by addressing women’s travel needs?
- What is the energy impact of making non-car options more accessible for caregivers? Shared modes might release parents from burdensome school trips.
- What is the energy impact of each breakthrough concept?
- To what extent is gender-biased travel contributing to the pay gap? If the pay gap were eliminated, would women be more likely to choose more energy efficient travel?

Looking Ahead

Breakthrough Challenge Approach

Although the innovations identified in this paper would best be initiated through government services, public sector procurement is extraordinarily difficult, both for the purchasing agency and for the vendor. Purchase cycles can be long, bureaucratic processes; disclosure requirements can limit communication between agencies and vendors; and insufficient knowledge of the current state of the industry can hamstring an agency's judgment of what to buy, exacerbated by the rapid pace of change of technology.

One approach government agencies increasingly employ is challenge-based procurement. Challenges enable policy makers to focus on what they know best—the problems they are solving and the impact they are seeking—and for outside parties to focus on what is actually needed to solve that problem and deliver that impact. As an alternative to the traditional specifications-heavy Request for Proposal (RFP), challenges focus on very concrete, action-oriented problem statements that can result in targeted solutions.

Defining the problem requires a thorough understanding of the policy, operations, stakeholders, and other perspectives—much as the Pink Tax workshops have begun to do. But defining the problem is just the beginning of the process. Innovators, entrepreneurs, community members, and others are invited to propose solutions to the problem. Often, there are multiple stages of structured discussion between the agencies and companies to narrow down the pool of possibilities. A smaller number of vendors continue the conversation, which often leads to highly structured demonstration projects or experiments. Potential vendors show what they can do, rather than simply speak about it—or about comparable work from other jurisdictions or industries. Can

the proposed solution actually work in the real world, even in a limited test case? What issues does the solution actually solve (with measurable indicators)? What new issues arise? Continuing these demonstration projects in greater depth and length positions the agency with the knowledge to transition to a traditional RFP.

Some notable examples of challenge-based procurement initiatives are the Transit Tech Lab (see case study call out box below), the NYCx Neighborhood Co-Lab and Moonshot programs, San Francisco's Startup In Residence, the United Kingdom's NHSx, and Dubai's Future Accelerators. These programs address policies as diverse as train signals, government blockchain, waste reduction, wayfinding for the visually impaired, and equitable health access.

The keys to success are:

1. Define a tangible problem to solve
2. Conduct broad outreach for potential solutions
3. Advance a well-developed plan for testing (including engagement from potential customers)
4. Maintain resources to test further or to scale solutions post-challenge

Breakthroughs to Address the Pink Tax on Mobility

The workshops began to set the stage for several breakthrough challenges.

To maximize the market potential, the Pink Tax challenges would ideally be sponsored by a consortium of public sector agencies (transit, law enforcement, cities, states) and underwritten by private sector investors (venture capital, transportation technology companies). The proposed outreach plan below is designed,

Case Study: Transit Tech Lab

The Transit Innovation Partnership is a public-private initiative that seeks to make New York the global leader in public transit.

The Partnership for New York City and the Metropolitan Transportation Authority jointly created the Transit Innovation Partnership in response to former Governor Andrew M. Cuomo's call for private-sector expertise to modernize public transit. An advisory board of leaders from academia, business, civic organizations, government, and labor guides the Transit Innovation Partnership's work. Programs include the Transit Tech Lab, which has executed more than 20 innovative technology pilots with transit agencies, and the pro bono creation of the MTA's groundbreaking live subway map.

The Transit Tech Lab is an accelerator program for startups solving public transportation challenges. Companies will pilot their technology with a transit system and help transform New York City. For example, the challenge-based program addresses:

- How can we reduce traffic by improving coordination at the curb?
- How can we make transit safer, healthier, and more responsive amid the pandemic?
- How can we make existing subway cars compatible with new signaling tech faster and at lower cost?

in part, to attract interest from potential co-sponsors, additional test sites, and future challenge participants. Finalists would be able to test their proposed solutions in pro bono or paid demonstrations at New York State study sites. Partners in other cities and countries would be enlisted to offer similar test opportunities to finalists, thus accelerating the path to scale for the most promising solutions. Winners would be selected based on their ability to bring a product or service to market across State regions, thus broadening the energy efficiency, mobility, and economic benefits.

Specific State case study sites should be selected based on the interest of an implementation partner as well as based on how comparable that site is to other New York and global locations. The more typical a site is, the more likely it is to attract interest from innovators and for effective solutions to meet the societal need.

Attracting investments and potential customers is critical for appealing to entrepreneurs to help solve the Pink Tax. New York offers programs across the State to encourage startups broadly. The State's Empire State Development and New York City's Economic Development Corporation each operate programs to match private investors in high-growth local businesses.

Understanding the energy impact of addressing the Pink Tax may open new avenues of support. As previously demonstrated, there are also significant energy implications of the current challenges in the transportation sector.

Specific test sites identified through the workshops include the:

- Tech Transit Lab partners, namely NYC Transit, New Jersey Transit, Long Island Rail Road, and Metro-North Railroad

- Buffalo bike and school programs
- Ithaca community-based transportation
- NYC university campuses, including NYU Wagner (Manhattan), NYU Tandon (Brooklyn), CUNY (throughout NYC)
- Employers seeking mobility options for employees

Outreach

The systemic transformations required to solve the above challenges and achieve the desired benefits will be seeded, in part, by disseminating this white paper to industry partners, entrepreneurs, transit providers, and cities. Key outreach audiences include the following:

- More than 100 upstate and downstate transit agencies
- More than 1,000 New York law enforcement agencies
- Nearly 2,000 mobility industry enterprises and innovators nationally
- Several New York and U.S. accessibility advocacy organizations
- Nearly 100 funders and investors leading mobility innovation globally
- Researchers on the Transportation Research Board's (TRB) Standing Committee on Women's Issues in Transportation as well as hundreds of researchers more broadly focused on transit and energy issues
- Tens of thousands of attendees at smart cities, urban innovation, and transportation conferences across the U.S. (e.g., Smart Cities Connect to reach the tech industry, TRB and NACTO to reach the public sector and transportation industry)

The benefits of outreach would include:

1. Improved insight into women's travel needs would help transit and transportation agencies better support non-commuting trips, the fastest growing segment for many agencies.
2. Through opportunities to understand and address the Pink Tax, businesses deploying shared bikes, au-

tonomous vehicles, and other mobility innovations could see increased uptake.

3. Whether or not they are already focused on gender, funders and investors could find many opportunities for high-growth businesses that derive competitive advantage from addressing the Pink Tax.
4. Social service providers and advocates would have new avenues for voice and impact in transportation policy and innovation, as well as greater awareness of mobility options available to their constituents.
5. The Pink Tax research and development roadmap would present many opportunities for research, including new angles for those seeking funding.

Workshop participants are at the core of this outreach, expanding understanding of the problems and solving the issues. In a follow-up survey, 85% said they wanted to continue to participate in related events, and more than half wanted to be involved in a leadership capacity (Figure 4).

Future Research

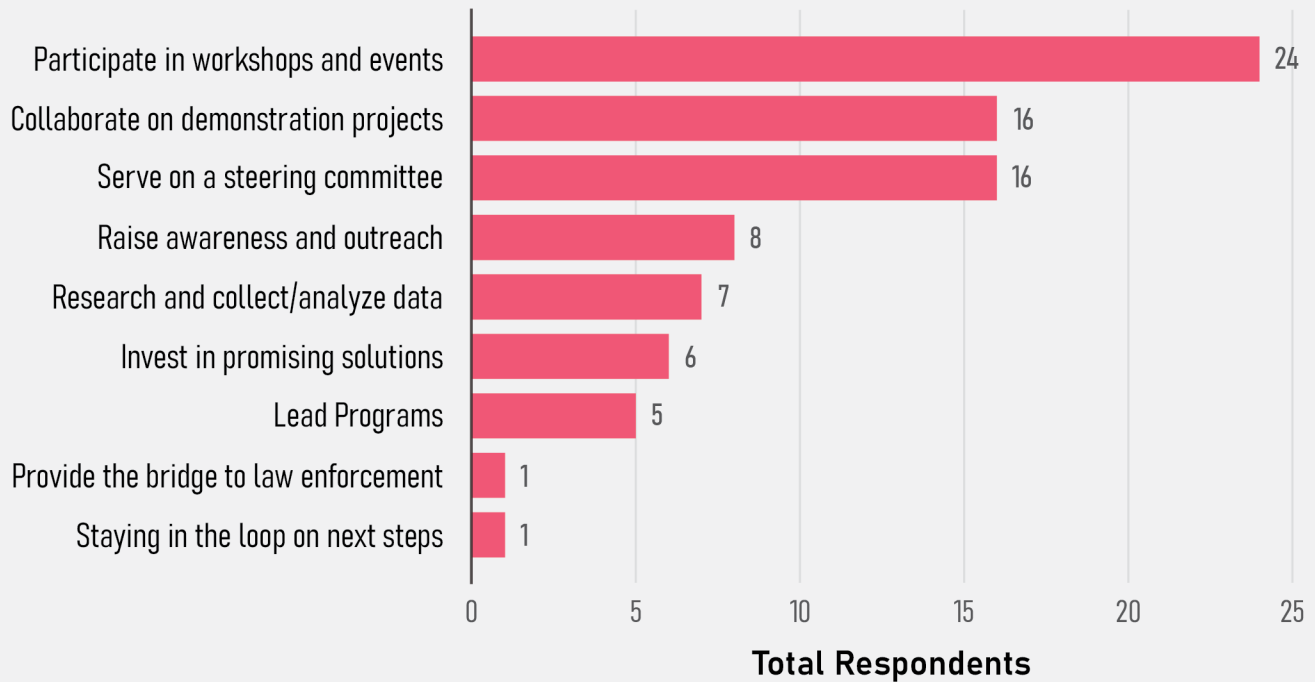
In order to continue informing the issue, it is recommended future areas of further research include two major perspectives brought forth in the workshops:

1. Key challenges and opportunities of the current state of practice with gender-sensitive mobility in the U.S. for incident reporting, shared micromobility designed for women's travel needs, inclusive trip planning, and station-specific applications (initiatives described in the workshop sections).
2. Tracking outcomes from changes to mobility to key factors identified in this study in light of new benefits, risks, and trade-offs when compared with traditional technologies and mobility services.

A summary table of these initiatives is included in the appendix.

Figure 4. How Workshop Participants Want to Stay Involved

Self-reported by participants who completed the post-workshop survey (n = 28)



SOURCE: PINK TAX ON MOBILITY POST-WORKSHOP SURVEY

THE PINK TAX ON MOBILITY

Conclusion

The Pink Tax on Mobility indicates a true expense—physically, economically, and environmentally—that women must incur while traveling. In particular, women are subject to sexual harassment and assault, and also must shoulder caregiving burdens. These two issues were the primary areas of focus of the 2018 research by the NYU Rudin Center for Transportation and the 2020 workshops discussed in this white paper.

The workshops identified nearly 70 solutions for women’s safety and caregiving needs that would also benefit the environmental impacts of vehicle use. Several key areas for improvement were identified:

- 1. Incident reporting:** simplify the reporting process and explore app-based services.
- 2. Shared micromobility designed for women’s travel needs:** expand fleets with new designs to accommodate bags and packages, with deployment

focused on off-peak and shorter range trips.

- 3. Inclusive trip planning:** account for safety considerations in trip planning software.
- 4. Station-specific applications:** engage local communities to crowdsource concerns and create custom-tailored solutions.
- 5. Gender audit tool:** include a gender-lens review to score transit projects moving forward.
- 6. Responsive lighting and accessible announcements:** ensure announcements are made in auditory and visual form to improve safety and usability for people with disabilities.
- 7. Family fares:** develop a singular payment option for families to ease cost burdens for caregivers.

While the workshops set the stage for implementation, the goal is to frame the issue for various stakeholders, lay the foundation for systemic change, and gather momentum by identifying high-impact, near-term interventions.

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Appendix

Future Literature Review Considerations: Key Enablers and Barriers to Breakthrough Concepts

Table 1 provides an initial summary of publications describing the benefits and risks of the current state of practice for the solution spaces noted in the areas of focus.

Table 1. Review of Benefits/Opportunities and Risks/Challenges of Breakthrough Concepts

Factors Considered	Literature Review of Metrics to Articulate Benefits/Opportunities	Literature Review of Risks and Key Challenges
Safe Transportation / Mobility: Incident Reporting	Use of technologies, e.g., smartphone apps to report incidents, record experiences, and create maps of offending hotspots (Ceccato, 2017); Access to work, school, grocery, and essential health services	Attitudes about safety concerns and influence of environmental beliefs (Hsu et al, 2019); Limited broadband access and digital connectivity; Isolation, lower community connectivity, and limited financial capital and human resources to manage or drive new services; Limited demand for new services due to private-ownership model
Shared Micromobility (not yet) Designed for Women; Co-benefits for Energy Efficiency in Transportation and Electrification of Transportation	A study from the City of Portland found that men are twice as likely to ride scooters than women. A major finding in the study found that women don't believe it is a particularly safe activity (Bliss, 2019)	Higher expenses; Lock-in to energy inefficient mobility choices and limited changes to energy production/consumption; Concern for jobs if not able to travel after dark
Inclusive Trip Planning and Station-Specific Applications to Enable Affordability / Accessibility / Equity	Women traveler resources (Frommer's, n.d.); Gender differences in spatial cognition to inform station design/applications (Bocchi et al, 2021)	Women travel more frequently with children; Walking is the most common mode around the world for women (Gupta et al, 2018); Many women have less experience with EVs (Sovacool et al, 2018); Delaying healthcare checkups; When/where to access food due to safety concerns

It is suggested that future research explore outcomes from changes to mobility in current pilots and their performance impacts. This could help to identify the perceived success rates and key outcomes for future planning. For example:

- “The Inter-American Development Bank (IDB) found that the higher the compliance with the transport schedule or the less congested the transport, the lower the probability that a woman will be a victim of a crime” (Galiani and Jaitman, 2016).
- An awareness campaign by the Washington Metropolitan Area Transit Authority (WMATA) in Washington D.C., in partnership with local organizations, focused on motivating victims of harassment to report those incidents to authorities. Among harassed persons surveyed, those who saw the advertisements were twice as likely to report an incident as those who did not (Collective Action for Safe Spaces, n.d.).
- “According to a UN (2009) report, improvement in transport infrastructure can significantly reduce women’s ‘time-poverty’ in rural areas, as well as increase their access to markets, schools, and services, with cascading effects on women’s productivity, health, and well-being (p. 8). Transport-driven access to basic utility services and markets have the potential to improve women’s wellbeing by decreasing the amount of time spent on domestic tasks, and by a concurrent release of time for income generation (World Bank, 2012; Malmberg, 1994)” (Gupta et al, 2018).

Future research could address more specific questions, such as whether new strategies have shown substantial gains in reducing the proportion of income women spend on transportation and housing, increasing the total populations served, and/or strengthening social networks.

In addition, a review of current plans addressing these and other issues, through harmonization of survey instruments, could help to fill identified key gaps in knowledge, inform modeling estimates on effectiveness of new management strategies (or scenarios for transformative change), and their potential impacts on people, mobility, energy use, emissions, accessibility, affordability, travel time, safety, and other priority indicators or areas of interest.

A compilation of implemented ideas, enablers, barriers, and how similar case studies / best practices were adopted elsewhere could help to expand research and practice that has high potential for impact and benefit (especially if both quantitative and qualitative impacts can be assessed in a standardized way across cities, regions, and nations). To any extent possible, data should be collected on viable pathways forward and their potential impacts such that planners and decision-makers can make stronger and more informed actionable insights and investments.