FINAL REPORT

NYU CAPSTONE: UNITED WAY OF CENTRAL MARYLAND

DEVELOPING A HUMAN-CENTERED APPROACH TO PUBLIC TRANSPORTATION IN CENTRAL MARYLAND
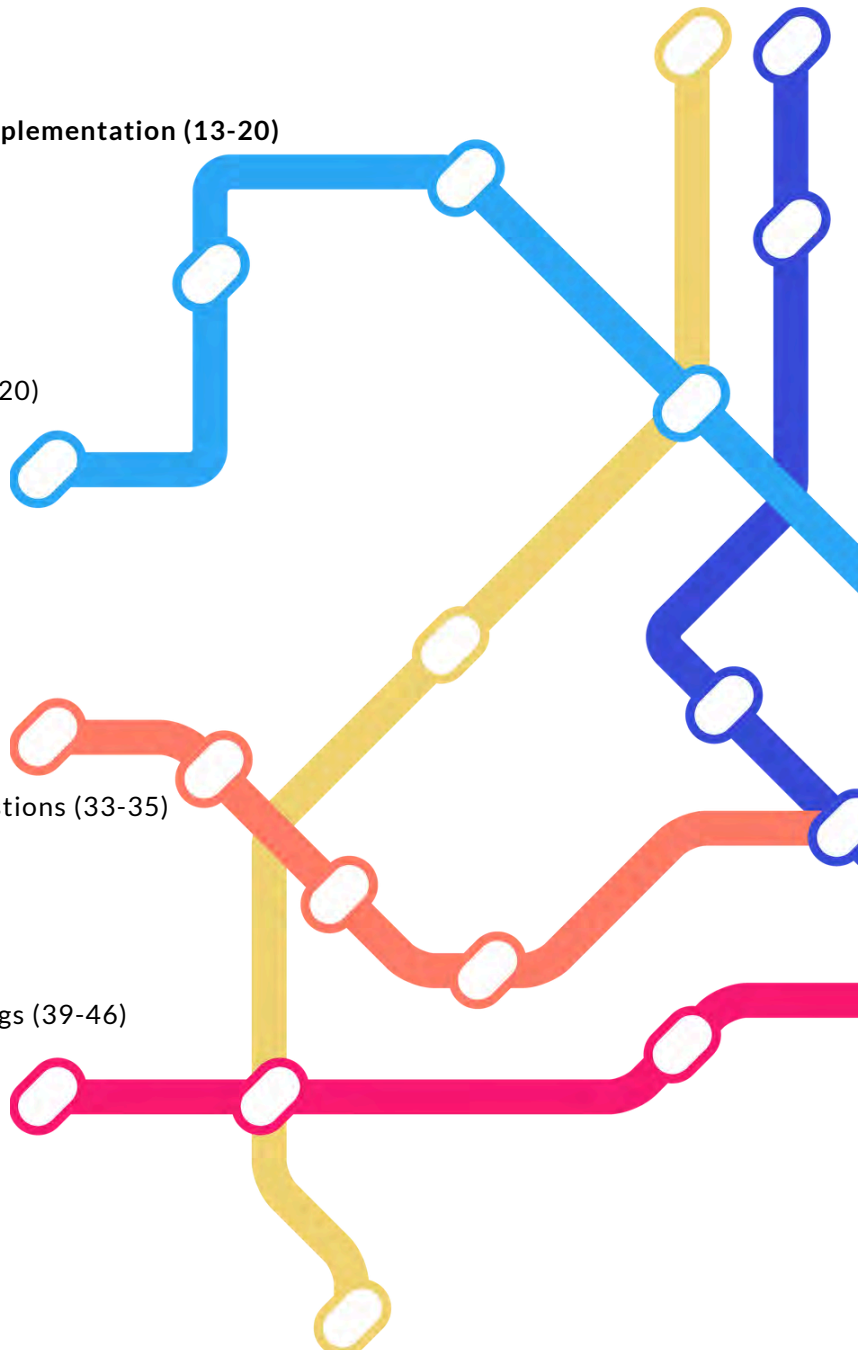
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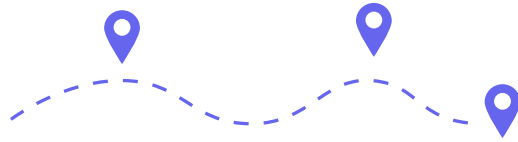
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EXECUTIVE SUMMARY

Image 1

Whether you take the bus, drive your own vehicle, use Uber on the weekend, or walk on the sidewalks in town, you rely on transportation to go about your daily life. But what happens when the bus is late, you don't have your own vehicle, or the Uber surcharge is making it impossible to afford? Central Maryland residents have been facing these issues on a daily basis. One particular study from the Johns Hopkins Bloomberg School of Public Health and the Baltimore Transit Equity Coalition found that 100% of jobs in the Baltimore region can be reached in one hour by car, whereas only 9% of jobs can be reached by public transit in that same amount of time (1). These barriers have an impact beyond the inconveniences they cause. The consequences of having an inadequate public transportation system bleed into every aspect of a person's life, from the financial burden it can weigh, to the sheer lack of reliability.

Between September 2024 and April 2025, in our partnership with the United Way of Central Maryland (UWCM), we were tasked with analyzing the flaws within the current transportation system in Central Maryland and how ALICE (Asset Limited, Income Constrained, Employed) residents are impacted by the flaws. From this analysis, we sought to present recommendations to remedy shortcomings with a human-centered approach in mind. To do so, we conducted a literature review and interviewed five individuals engaged in shaping Maryland's public transportation landscape: Michelle Martin (Director of Planning, Maryland Department of Transportation), Delegate Mark Edelson (District 46), Councilwoman Christiana Rigby (District 3), Robin Budish (Director of Transit Choices), and Jimmy Rouse (Founder of Transit Choices). We also designed and conducted a survey, gathering insights from 185 residents on their experiences with the current public transit system.

The overarching issue with the Central Maryland Transportation system is a lack of accessibility to adequate transportation methods, particularly for ALICE residents. This lack of accessibility is shown in three major ways: **connectivity, reliability & frequency, and safety.** The greater impact of these challenges on the public seeps into both the personal and professional lives of community members. To remedy these shortcomings in the current transportation system we recommend the following:

Connectivity	Reliability & Frequency	Safety
Improve connectivity by conducting a comprehensive audit of existing routes, prioritizing the completion of the Red Line, expanding service to include stops in underserved areas, and implementing on-demand shuttle services in low-density communities.	Enhance reliability and frequency by increasing bus frequency on high-demand routes, expanding service hours during evenings and weekends, requiring transit agencies to provide real-time updates through local transit apps, and linking financial subsidies for riders to measurable improvements in transit performance.	Promote safety by upgrading current bus shelters and establishing new ones that provide comfort for riders.

We also acknowledge that implementing these recommendations will not be a straightforward and easy task. With that in mind we highlight three considerations for implementing these recommendations. The first is **budget limitations**, second is the **prioritization of issues by leadership**, and third is the **necessity of cross-sector collaboration**.

INTRODUCTION: THE GREATER IMPACT

Barriers to Employment and Economic Mobility, Health, and Education

Lack of connectivity, reliability & frequency, and safety disproportionately impacts the ability of individuals to commute to job centers, health facilities, and school. Transportation barriers are a significant factor in unemployment and underemployment among ALICE residents in the Greater Baltimore region. Many folks are unable to get to their health appointments or go to school on time, which leads to long-term consequences like worsened health outcomes and lower educational attainment.

In June 2023, Governor Wes Moore announced the relaunch of Baltimore's Red Line rail. Back in 2015, Governor Hogan had canceled the project, and the funds were reappropriated to repair roads in majority-white communities. A study by Johns Hopkins University found that the newly revived Baltimore's Red Line project could substantially cut travel time for people working mid-to-low-income jobs along its proposed service area, increasing access to employment. The completion of the project is currently planned for after 2026. The project would expand accessibility for communities in the east and west portions of Baltimore. However, with a Republican administration in the White House, with a priority to cut funding for transit expansion, the Red Line may not receive the significant federal support that it needs.

The inability to connect to one's job or healthcare provider has lasting negative impacts on a person's life. When interviewing Delegate Mark Edelson, he shed light on the importance of transportation and upward mobility for his constituents, stating "the most important thing for somebody to be able to uplift themselves financially is access to a job". Additionally, per the National Institutes of Health, this lack of connection to healthcare can lead to chronic illness, increased hospital readmissions, and a disruption in continuity of care. When a community is not connected appropriately to public transportation, the health of that community suffers (2). Additionally, the economic mobility of a person suffers when their work commutes are longer and more strenuous. The Quarterly Journal of Economics published a study in 2017 that found that children who are raised in commuting zones with a shorter average commute time earn a higher income in adulthood. They also found that when commute times are reduced by one standard deviation, there is a 7% increase in income in adulthood (3). An investment in increasing connectivity in public

transportation not only increases rider experience and satisfaction but improves the overall quality of life for a community.

The Baltimore Banner found that roughly 25,000 students rely on the current public transit system and have issues getting to school on time every day (4). The average city student's commute is 40 minutes by transit, which is more than twice as long as the average yellow bus ride in Baltimore County. Unlike other metropolitan cities, Baltimore City Public Schools do not have yellow school bus services for its students beyond fifth grade. The analysis also found that about 1 of 4 school buses are not on time during students' commute or do not show up at all in the morning, with even worse service during the afternoon. Baltimore City Public Schools CEO Sonja Santelises noted that in most major cities, students are able to take mass transit to school with few issues, and that "Maryland's subpar public transit system reflects the state's attitude toward poor residents, who are more likely to ride it." Furthermore, on the buses, "students describe being surrounded by marijuana smoke, sexually harassed and confronted by bizarre and frightening behaviors," emphasizing the need for safer transit.

SCHOOLS WITHIN 30 MINUTES — Image 2

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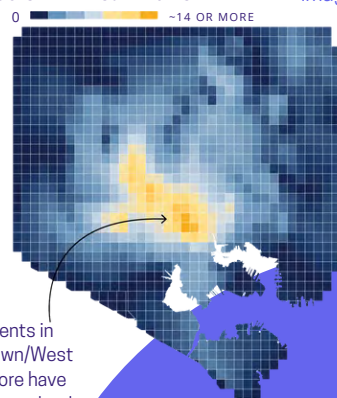
Students in downtown/West Baltimore have the most school options nearby.

Project Scope

Our project goal was to analyze the broader impact of inadequate transportation on ALICE residents, and to determine to what extent transit serves as a barrier to other areas of life. We aimed to determine recommendations that would advocate for a human-centered approach towards public transportation, revamping the current design of the transit system to prioritize those who have limited resources.

PROJECT DESIGN & METHODOLOGY
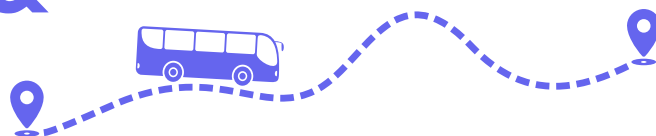
For this project, we used three different methods of data collection to inform our conclusions: a literature review, interviews, and a survey.

Literature Review

We analyzed the current legislative transportation policy landscape in Maryland, conducting a search of relevant studies, news articles, web pages, and reports from 2017 onwards. The search was conducted on NYU ProQuest Central and Google, and search terms included "transportation," "Maryland," "public transit," "transit equity," "Baltimore," and "transit."

The Maryland 2050 Transportation Plan provided the main contextual foundation for this research. We researched peer organizations within Maryland that are working to improve transportation in the state. Lastly, we completed a comparative analysis between transportation policy in Maryland and cities of similar size to the Central Maryland area, such as Philadelphia and Boston.

Interviews

To further understand the transportation policy landscape in Maryland, we conducted four interviews with the following at the recommendation of UWCM who recognized these individuals as leaders in the transportation space:

- **Michelle Martin, Director of Planning at the Maryland Department of Transportation**
- **Delegate Mark Edelson, District 46**
- **Councilwoman Christiana Rigby, District 3**
- **Robin Budish, Director, and Jimmy Rouse, Founder of Transit Choices.**

These interviews set the foundation for our understanding of the transportation landscape in Central Maryland. Our questions focused on the interviewee's expertise on the biggest issues with current transportation, their experiences advocating for improvements, and insights into how to best improve the system, particularly for ALICE residents. Each interviewee came with their own unique knowledge and perspective of the system. For the specific interview methodology and content, please refer to appendices B, C, and D.

Survey

To inform recommendations for improving transportation policies, we gathered information from those most directly impacted — the residents of Central Maryland using the current transportation system. We designed the survey to include 19 total questions. The survey was split up into four sections to gather information on demographic information, transportation needs and preferences, intersectionality and broader impacts, and suggestions and final thoughts. UWCM used the Voter Voice system to send the survey directly to an estimated 3,000 Central Maryland community members. The survey was live for one month and reminders were distributed via VoterVoice three times. We received **185 responses** from Central Maryland residents which included both quantitative and qualitative data from a mix of multiple-choice, ranking, and open-ended questions. The survey responses were collected from a diverse group of respondents from different demographic backgrounds. Respondents ranged in age, with high participation from working-age adults. The sample included individuals of varying gender identities, income levels, and household sizes. Many respondents came from households with children, and the data reflected a variety of transportation modes and commuting patterns. This diversity allowed us to capture a wide range of perspectives on transportation needs, barriers, and experiences. For the specific survey methodology and content, please refer to appendices E, F, G, and H.

Limitations of Methodology

It is worth noting the following limitations to our methodology. The surveyed sample of 185 respondents, who are all contacts within UWCM's Voter Voice system, may not fully reflect the characteristics of the entire Central Maryland ALICE population. This may affect the generalizability of the conclusions. Additionally, it is likely that those who have adamant opinions of transportation in Central Maryland would have been more inclined to participate, particularly those with strong thoughts about improvements and challenges within the current system due to the survey focus. For the interviews, our analysis is, of course, limited to the four interviews we had. Although we chose these four interviews selectively and intentionally, there may be other stakeholders who may have different insights.

*"If I give my friend a ride to their doctor appointment, it takes about 20 minutes. However, **if she needs to take the bus, she needs to leave her home 3 hours earlier** to connect to the bus that gets her to her appt, which is a different route. It then takes her about another 2-3 hours to get back home. **For one 20 minute doctor appt**."*

*"Students are often **late for school** due to **bus shortages or being not on time**."*

*"Nighttime services are a major challenge. **I would take the bus to work more often if I knew I had a reliable ride home**, but by the evening, buses are constantly late or just missing, and I wait 60+ min for a bus that's supposed to run every 20 minutes... in the dark, on a busy corner, in the rain and cold, etc."*

Survey Image

SUMMARY OF KEY FINDINGS

Transportation is not only an important part of life, but also a key factor in determining whether residents can participate fairly in society. Our survey results clearly reveal the structural impact of poor transportation, which poses a long-term pressure on the ALICE community in particular.

Impacts on Everyday Life

Insufficient transportation connectivity significantly affects all aspects of residents' lives. When asked, "Has your access to transportation impacted any of the following areas of your life?" and after eliminating all N/A and "Prefer not to say" responses, we found that the largest number of respondents (59) said that transportation affected their employment opportunities. This was followed by social connections and community engagement (54), the ability to purchase groceries and other necessities (49), access to healthcare services (47), and education opportunities (28).
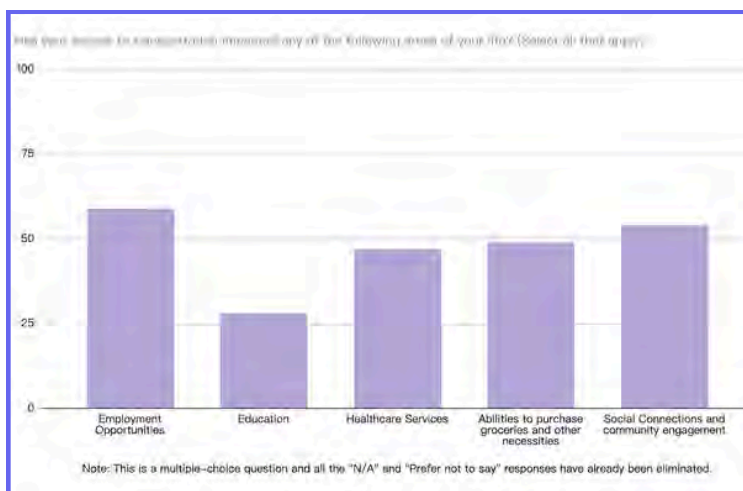
Many survey respondents expressed how the inadequacy of public transportation impacts their ability to get to work. One survey respondent, who noted that walking and public transit were their main mode of transportation said, *"Nighttime services are a major challenge. I would take the bus to work more often if I knew I had a reliable ride home, but by the evening, buses are constantly late or just missing, and I wait 60+ min for a bus that's supposed to run every 20 minutes... in the dark, on a busy corner, in the rain and cold, etc."*

Another Maryland resident, who relies on her car and never uses public transit, said that it is currently *"hard to impossible for my co-workers to get to our office by public transportation."* This is a privilege that those who can't afford to have a car do not have.

Nearly 70% of the respondents' one-way commuting time exceeds half an hour. When asked about average commute time, the data showed that only 10.2% of the respondents had a commute time of less than 15 minutes, while 25.4% said that their commute time was more than 1 hour, and another 45.7% of the respondents had a commute time between 30 and 59 minutes. Long waiting times and transfers not only affect daily arrangements but also weaken people's trust in the public transportation system, disincentivizing use of public transit, while incentivizing use of more expensive or inconvenient ways to complete their commutes.
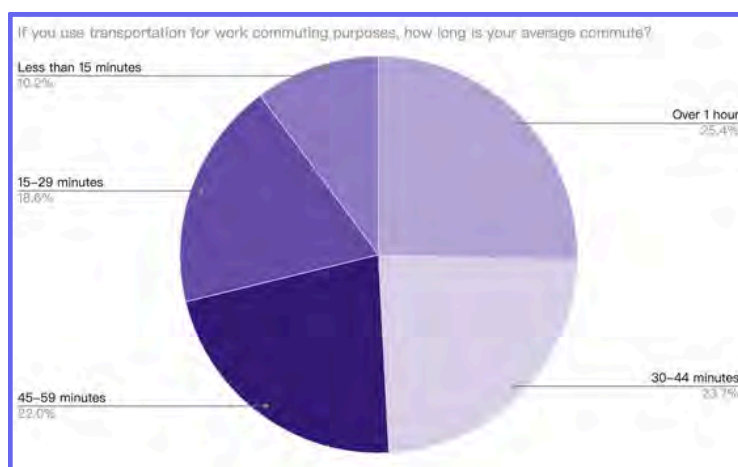
While not a majority, there were several testimonials that highlighted inadequate transportation as a core barrier to education. For example, one respondent mentioned worrying for the safety of students who take public transportation to school. Another wrote that *"public transportation is a severely limiting factor in high school choice decision-making."*

Additionally, a lack of quality transportation options prevents individuals from receiving access to healthcare. One social worker responded to our survey that *"transportation is the number 1 barrier to patients meeting their healthcare needs."* Another said that *"Many with medicaid in Maryland have vehicles but their vehicles do not work or they don't have gas money and they can't get transportation help from medicaid to go to medical appointments."*

According to our survey data, 62.7% of respondents reported that transportation costs have at least some impact on their overall financial well-being, with 23.8% indicating a significant impact and 38.9% noting a slight impact. Only one-third of respondents said transportation costs have no impact at all. This suggests that while cost may not have been the top priority for all respondents, it remains a consistent financial stressor. The economic burden of transportation contributes to long-term inequities, and this is even more of a blow to ALICE residents.
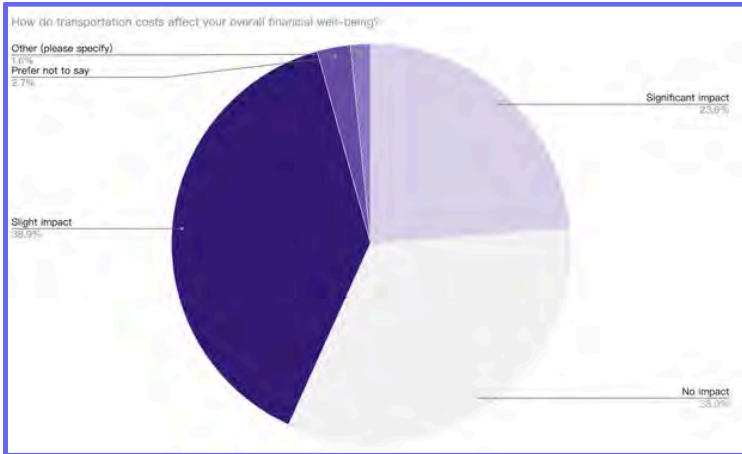
Improvement Areas Identified by Residents

Our research shows that the current transportation system is not effectively meeting the basic transportation needs of Central Maryland residents, especially the ALICE population: More than 60% of survey respondents disagreed or strongly disagreed that the current public transportation options met their transportation needs, and an additional 20.5% had a neutral opinion of transportation.
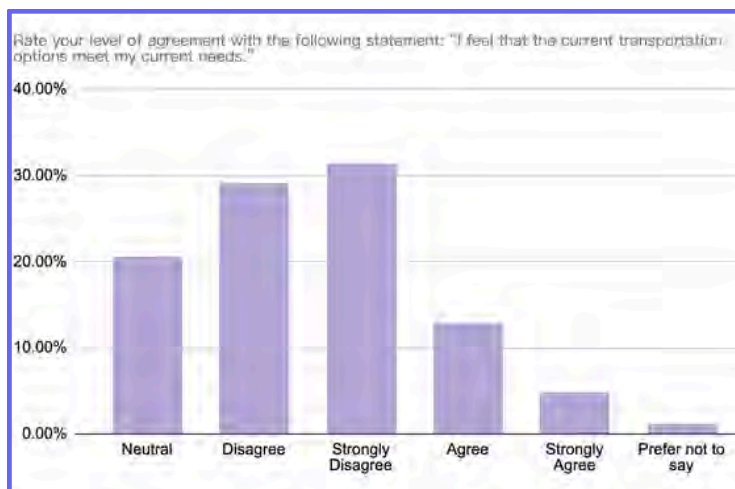
When asked to rank a list of potential improvements to public transportation based on what they felt was most needed, connectivity was ranked the top concern ("Expanded routes and coverage") by most respondents. Respondents

underscored this concern in other parts of the questionnaire as well.

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After connectivity, "More reliable service" and "More frequent service" were the following priority rankings for respondents, indicating concerns about the punctuality and density of transit schedules, and emphasizing the concern about the reliability and frequency of public transportation. Finally, safety remains a top concern as a considerable proportion of respondents ranked it as the second or third priority.

Cost concerns ("Lower fares" and "Free transportation") were listed as lower priorities (4th to 6th), indicating that despite costs, riders are more concerned with connectivity, reliability & frequency, and safety. It is worth noting the overall low ranking of "Accessibility upgrades for disabilities." The importance of this issue is not widely prioritized in the overall sample and may also indicate that the public's attention or awareness of this issue is lacking.
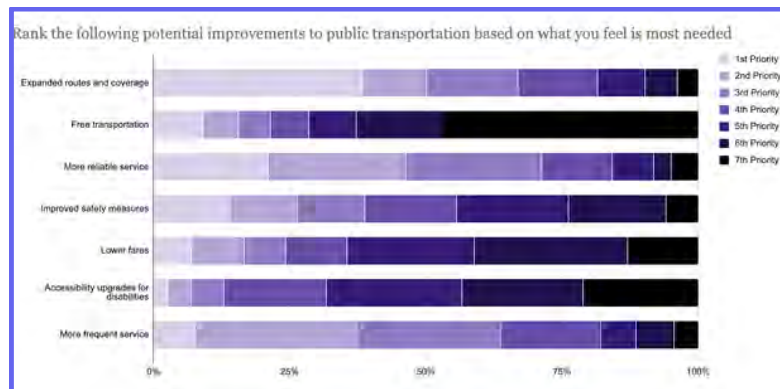
To better understand how and where the system is falling short, the following discussion is organized into three key themes, or areas of improvement that were identified as most pressing:

Connectivity, Reliability & Frequency, and Safety

Each theme includes quantitative data from the survey as well as qualitative data from interviews with transit experts and elected officials, and from the survey, highlighting real-world perspectives from ALICE residents themselves. Through the data, it is clear that widespread inadequacy of transportation creates barriers to basic quality of life and access to services.

CONNECTIVITY

Limited access between where one is and where one needs to go

Overview of the Issue

Many ALICE residents in the Greater Baltimore region live in areas with limited public transportation options and often are only able to get to their desired destination through inconvenient routes, resulting in lengthy travel times and tedious transfers. Gaps in public transit routes disproportionately affect low-income communities, particularly those in suburban and rural parts of the region, creating significant barriers to mobility.

These public transit systems have systematically been underdeveloped to keep historically oppressed populations from upward mobility. The Transit Investment Need Index (TINI) is a composite score developed to identify areas in the Baltimore region that require significant investment in transit infrastructure. It is based on four themes: transit access, social vulnerability, air quality, and health. Each census tract in the region is ranked according to these themes, and the summed scores are used to create the TINI, where a higher score indicates a greater need for transit investment. The TINI map reveals a striking pattern of investment needs, particularly highlighting that the highest concentrations of census tracts in need of investment are located within Baltimore City, reflecting the historical "Black Butterfly" pattern of neglect due to redlining policies, thus illustrating the past of racial segregation. This is purposeful -- to keep these marginalized populations physically out of certain areas (5).

In 2015, Governor Hogan canceled the Red Line project, a promising high-speed rail that would have provided significant connectivity between the east and west portions of Baltimore, and addressed some of these gaps. The funds were reappropriated to repair roads in majority-white communities. In June 2023, Governor Wes Moore announced the relaunch of Baltimore's Red Line rail, but it may be stalled with the recent presidential administration's priority to cut funding for transit expansion.

> *"There are entire areas of the county that [are] inaccessible to public transit, even though workers need to get to work sites in these areas."*

> *"I currently live in Middle River and often go to the city. The closest bus stop from the Bay Country neighborhood is a mile away on Eastern Avenue, and there are no sidewalks on the way to the stop. I would love to see a reliable/requestable shuttle service that helps get people to bus stops safely if routes are unable to be expanded."*

Findings

38.4% of respondents ranked "Expanded Routes and Coverage" as the #1 most needed potential improvement to public transportation. Additionally, out of the optional write-in responses, 30% of survey respondents expressed accessibility issues due to a lack of connectivity (inadequate and/or inconvenient routes from their residence to their desired destination). 21.6% of respondents cited specific examples of how this lack of accessibility negatively impacts their own or a loved one's ability to receive access to health care, employment, or education. One survey participant noted that "I am the parent of an adolescent who simply cannot get around because of the limited transportation routes in Howard County. There is no safe stop near our home or one at school. There should be transportation to/from his school (GPHS) to Howard County Community College so these students can be active in the jump start program. There needs to be a sidewalk or bike path from RTE 1 to Guilford Road so that the kids who live around the school can participate in afterschool activities without disrupting home/work." Additionally, respondents specifically referenced the much anticipated Red Line rail as a foreseeable improvement to the transportation system.

Respondents provided explicit details about the inconvenience of their commutes using public transportation, citing multiple transfers and long commute times as a major issue when compared to driving. One respondent noted that "In order to get from Point A to Point B, you often have to go into the city center and then redirect north or south, which adds to transit time and transferring. There should be better bus routes connecting Towson to parts of NW Baltimore. It should not take 90 minutes and 3 buses to get from NW Baltimore (Forest Park area) to GBMC in Towson. It is approximately 23 minutes driving a car and 7.5 miles, but takes approximately 90 minutes and 3 buses using public transportation."

Jimmy Rouse, Founder of Transit Choices, expressed similar sentiments when interviewed, noting that "inefficient public transit that is not equitable, …reinforces poverty". This bold statement, as he called it, emphasizes the reliance on appropriate transportation options to get residents to where they need to go. The Central Maryland community is faced with "barriers to opportunities, to jobs, to healthcare, to school [and], to healthy food", which impacts a person's life beyond the inconvenience of a commute.

Rank the following potential improvements to public transportation based on what you feel is most needed

RELIABILITY & FREQUENCY

Inability to rely on public transportation due to low regularity and predictability

Overview of the Issue

The lack of reliability on public transportation and irregular schedules has similar effects to the issue of a lack of connectivity; it creates a barrier to residents' ability to get to where they need to go. Even though a viable route may exist for a resident to get from point A to point B, the unreliable and infrequent transit options can deter residents from using public transit.

"While I am fortunate not to rely on public transit all the time, I am familiar with the frustrations of the limited and unreliable schedules. I do typically use it at least once per month, and I add at least 50% more time than the schedules call for in order to arrive on time."

"The amount of time public transportation takes is a deterrent to frequent use."

Maryland transportation, particularly in the Baltimore region, has been characterized by insufficient operational and maintenance funding. A train operator shortage has been a recently evolving issue, leaving about a third of Baltimore's light rail operator positions vacant. Two years ago, this forced the MTA to cut the line's official weekday headways from every 10 minutes to every 15 minutes to stabilize its schedule (6). A recent survey conducted by the Johns Hopkins 21st Century Cities Initiative revealed that one in five residents in the Baltimore area reported having to "at least sometimes... reschedule an appointment, skip going somewhere," or face other inconveniences due to transportation issues within the past 30 days. The figure was significantly higher among Black residents, with approximately 43% indicating experiences of transportation insecurity (7). Organizations have called for efforts to improve the system to make it more reliable and efficient, indicating the need for improved workforce training and development for expanded service.

Findings

We found overwhelming consensus around the lack of reliability of public transportation among survey respondents, with much-expressed frustration over delays and buses/trains simply not showing up. 25.8% of respondents chose unreliable schedules as the top challenges they face, and 22.1% chose long wait times.

Do you encounter any of the following challenges when using public transportation?

Inaccessible vehicles or stations 4.2%
Cost of fares 7.7%
Unreliable schedules 25.8%
Lack of nearby stops/stations 20.1%
Long wait times 22.1%
Safety concerns 20.1%
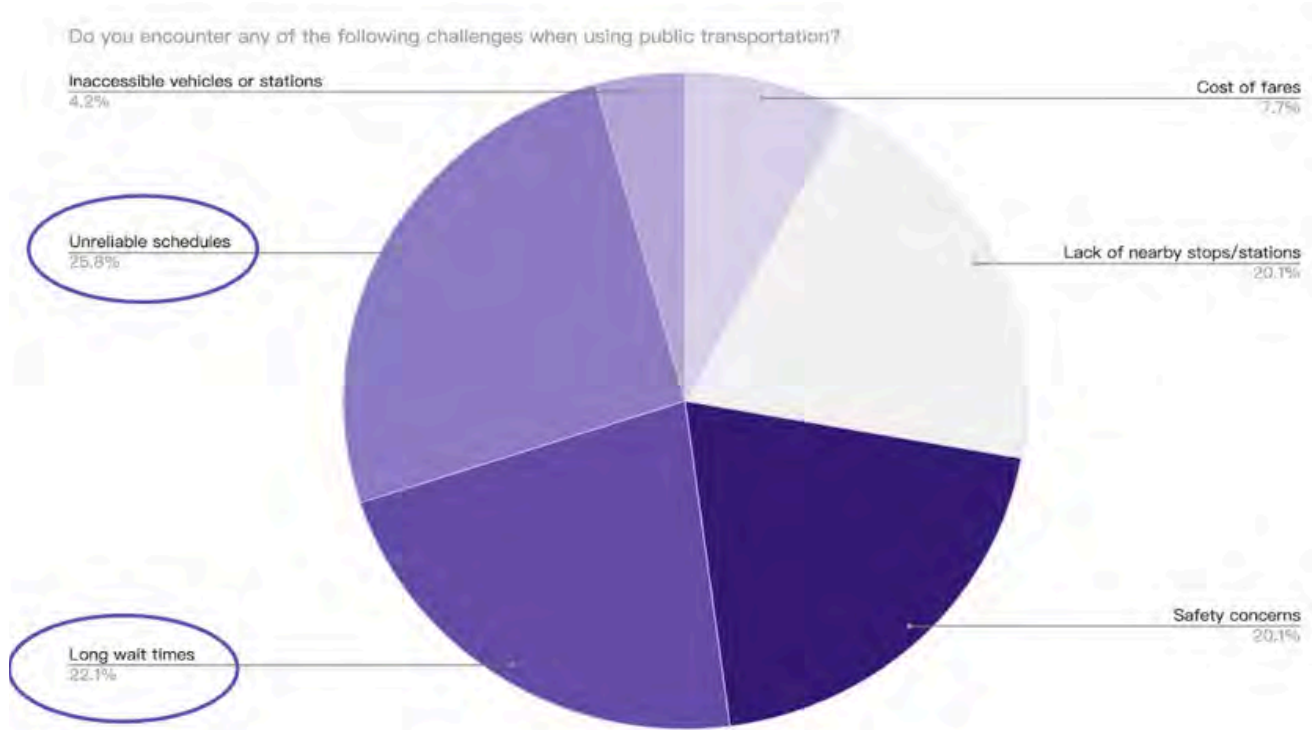
One Maryland resident wrote in response: "*When referencing schedules and using the app, buses didn't show up on time, and I was forced to find another way to get to work (walk/run, car, Lyft) or be late.*" Of respondents who commute for work, 25.4% reported average commute times of over 1 hour, and an additional 22.0% commute for 45–59 minutes, signaling a heavy time burden for nearly half of all riders.

21 respondents expressed frustration with the infrequency of certain routes, and the lack of accuracy of schedules. For example, one resident remarked that an improvement they would like to see with public transportation would be "*More buses and trains going to and coming from East Baltimore County in particular and all of Baltimore County in general*".

Survey respondents also pointed out the preferential treatment of those with typical 9-5 careers, and "*that the transit system runs with very privileged attitudes. They expect that people only work Monday through Friday. This leaves nursing home employees, restaurant staff and hospital workers having to allow hours to commute to work on weekends when service is greatly limited.*"

It is also apparent that the lack of reliability and frequency is only exacerbated by a lack of access to real time, accurate information about when buses and trains are arriving. This prevents users from being able to plan their commute accordingly.

When interviewing Jimmy Rouse, Founder of Transit Choices, he discussed how public transportation impacted him personally as an employer. During his time as a Baltimore restaurateur, he employed 95 people and had a rule about employee timeliness. If employees were late to work by more than 15 minutes, in three separate instances, they were fired. He often had to let people go because of this, despite many being hard workers. They were typically single mothers with children who could not manage to get their children to school in time before work, because the bus system they relied on was frequently late or simply absent. Rouse was sympathetic to their situation but was put in a difficult situation with having a business to run. He noted that it "*broke [his] heart to see these people who wanted to work in good work [but] because of the transit system couldn't get the job at the restaurant*".

SAFETY

Lacking the feeling of security when using public transportation, deterring public use

Overview of the Issue

Safety does not happen on accident. It happens because people make the changes to create it. The current Central Maryland system is in need of changing to ensure its residents can feel safe using it. When an individual does not feel safe using the bus or riding the train it can exacerbate negative feelings towards the system as a whole. With these ongoing feelings it can lead a person to no longer use the system all together.

While the 2050 Maryland Transportation Plan cites a commitment to improve road and pedestrian safety by reducing fatalities and injuries, there is little emphasis on improving user experience on public transportation when it comes to safety matters. Similarly, existing literature on the topic of safety primarily focuses on the high mortality rate of pedestrians. While it is indeed important to incentivize biking and walking, safety of bus and train users should also be prioritized.

"Additionally, addressing safety concerns, particularly during darker months, is critical. Enhanced lighting at stops and more frequent service could help alleviate the fear of waiting in unsafe conditions, particularly for female passengers."

"The "security measures" that are supposed to be available really aren't. What good are cameras if they aren't used? What good is police at a stop if they can't do anything to help you?"
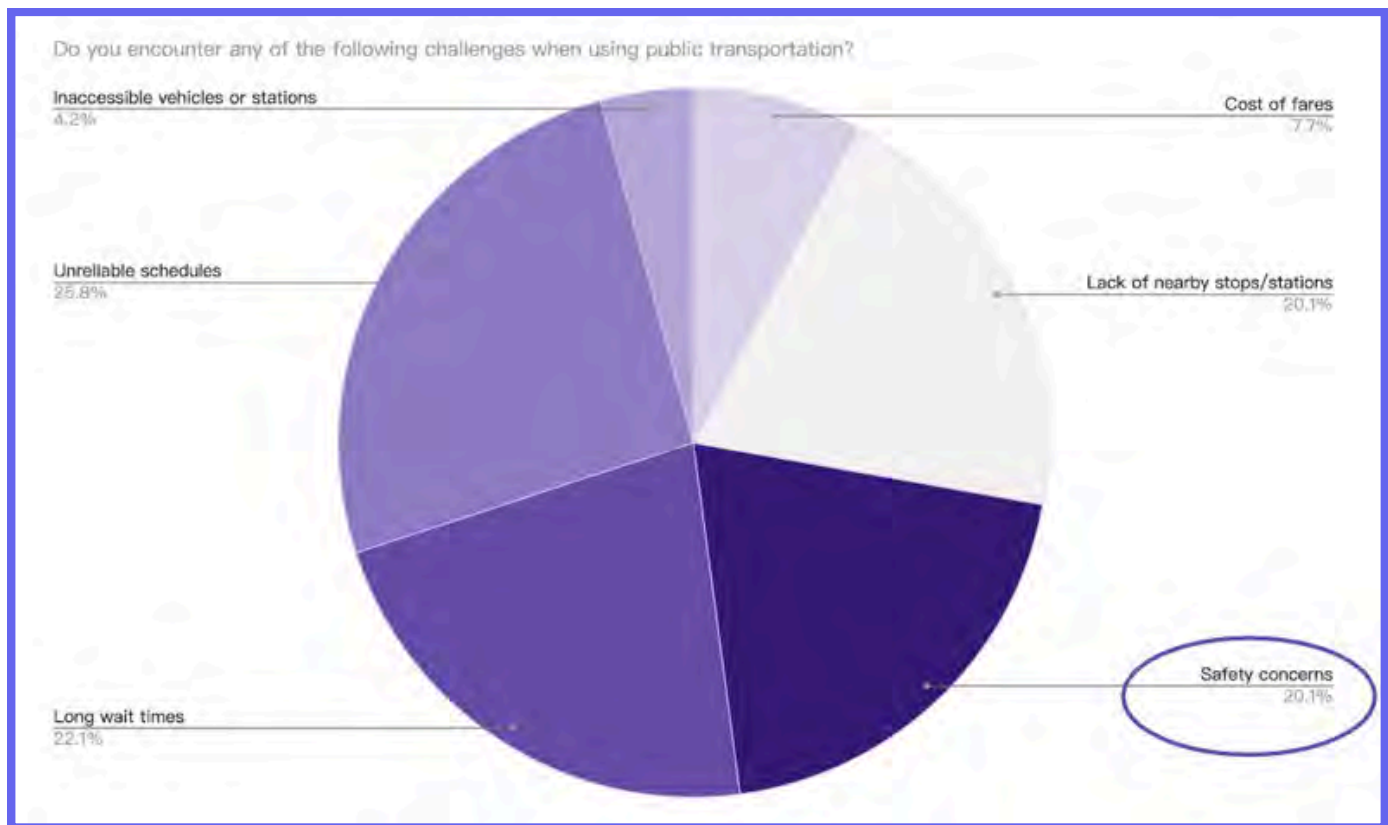
Findings

Survey responses highlight significant safety concerns that disproportionately affect residents who rely on public transit as their primary mode of transportation.

In particular, some respondents expressed concerns about poorly lit transit stops and stations, particularly in low-income areas. Dark and unprotected waiting areas exacerbate feelings of vulnerability, especially for women, elderly passengers, and students. Residents who do not feel safe using the bus or the train may grow a negative perception of the system as a whole.

Respondents reported incidents of harassment, assault, and disruptive behavior on buses and trains. One respondent noted that "Transit is dangerous - unsafe for solo female travelers," and another emphasized "the need for visible security on the subway, and swift repair of elevators and escalators."

Safety is closely tied to reliability. Delays, infrequent service, and unreliable schedules force passengers to wait longer, often in conditions that make riders feel unsafe. Expanding service hours, particularly for early morning and late-night shifts, and ensuring timely arrivals and departures would reduce wait times and improve overall safety. Respondents also highlighted the lack of safe pedestrian and bicycle infrastructure connecting to transit hubs.

Safety concerns are listed as the third biggest challenge (20.1% of respondents), second only to "unreliable schedules"(25.8%) and "long wait times"(22.1%). This shows that although the challenges of the transportation system in terms of wait times, reliability, and connectivity are more significant, safety is also a major concern when using public transportation.

RECOMMENDATIONS & CONSIDERATIONS FOR IMPLEMENTATION

Recommendations for Connectivity:

In this section we detail recommendations for our key findings of reliability & frequency, connectivity, and safety. We also address considerations for when implementing these recommendations.

Filling Critical Gaps in Transit Routes

The creation of **express, frequent-service bus lines** connecting neighborhoods that are **transit deserts**, (e.g. NW Baltimore, Middle River, Essex) to **employment, education and healthcare hubs** (e.g. Towson, White Marsh, downtown Baltimore) could feasibly be implemented without altering infrastructure immediately and drastically. Simultaneously, an audit of current routes, gauging their effectiveness, and assessing the elimination of inefficient routes that typically force riders into downtown areas only to transfer outward, would support a path for greater connectivity. Advocacy to redesign bus routes to minimize transfers, like having a direct NW Baltimore-to-Towson line, instead of requiring a downtown detour, would also support greater connectivity. In terms of longer term planning, the TINI can be used to plot out and prioritize new routes, both for bus and light rail, in high-need census tracts with poor transit access. UWCM should advocate for the completion of the Red Line, as well as expansion of the regional rail (MARC, Light Rail) with more stops in underserved areas. For example, the Southern Maryland Rapid Transit, a project that "aims to connect commuters to D.C.'s transit system via a light rail line or dedicated bus lane between Waldorf and a Metro station in Prince George's County," is recently back in motion (8).

For existing routes, we **recommend adding stops in underserved areas with safe pedestrian access**. The stops should be within walking distance of key destinations, like grocery stores, health clinics, and schools. This plan to promote transit equity would require commitment from state and county agencies, and a pledge to improve routes and add stops in underserved neighborhoods. Additionally, **community input in route planning would allow for future improvements to be truly human-centered.**

The region could also pilot **microtransit or on-demand shuttles** in low-density areas where fixed routes are impractical. This could be achieved by developing a dynamic demand-responsive bus algorithm platform at the state level, integrating real-time booking demand and existing bus route data. It can reduce public transportation blind spots and shorten commuting time for ALICE groups.

The state could adopt a similar model to the Los Angeles program outlined below, and prioritize ALICE-dense, transit-poor counties for initial deployment, **using the TINI map to identify areas with the greatest needs for these programs**. To maintain fare-equity, we recommend the implementation of an income-tiered fare cap (e.g., $3 daily maximum for ALICE-qualified riders), cross-subsidized by state carbon credits (9). To fund the program, we recommend leveraging the Federal Transit Administration's Rural and Small Urban Area Grants to offset startup costs, mirroring Metro Micro's funding model.

Case Study:
The Implementation of Metro Micro in Los Angeles — Policy Background and Objectives

The Los Angeles County Metropolitan Transportation Authority (LA Metro) launched the Metro Micro service in 2020 as an innovative response to chronic public transit gaps in low-density suburban neighborhoods. With over 30% of Los Angeles County's ALICE population residing in areas with limited bus coverage, traditional fixed-route buses struggled to serve these communities efficiently. The program aimed to reduce spatial inequity by deploying a demand-responsive transit (DRT) system, leveraging real-time algorithms to dynamically adjust routes based on passenger demand. This initiative aligned with California's broader climate goals, targeting a 15% reduction in single-occupancy vehicle trips by 2025.

Logistics of Metro Micro Program

Passengers book rides via a dedicated app or phone call, with the algorithm clustering requests within a 15-minute window. Routes are optimized in real time, minimizing detours (10). As of 2024, Metro Micro charges a standard fare of $2.50 per ride, with reduced fares available for seniors, students, and persons with disabilities (11).

The program has a fleet of small vehicles that seat up to nine passengers, serving eight designated zones across Los Angeles County (12). The service prioritizes neighborhoods with limited access to traditional bus or rail options, commonly referred to as transit deserts. The program initially launched in December 2020 in Watts/Willowbrook and LAX/Inglewood, and expanded to include North Hollywood in early 2021 — areas where many households lack access to private vehicles (14).

Implications for Maryland

The success of Metro Micro in Los Angeles provides a valuable reference for Maryland to improve transportation accessibility, especially in underserved and low-density communities. Metro Micro is a good example of how to fill the gap between the first and last buses and connect residents to existing fixed-route services. This approach is based on traditional bus routes, which not only expands service coverage, but also does not require high costs, but does provide residents with flexible travel options. Maryland's transportation department can learn from Metro Micro's experience to build a more responsive, inclusive and efficient public transportation network.
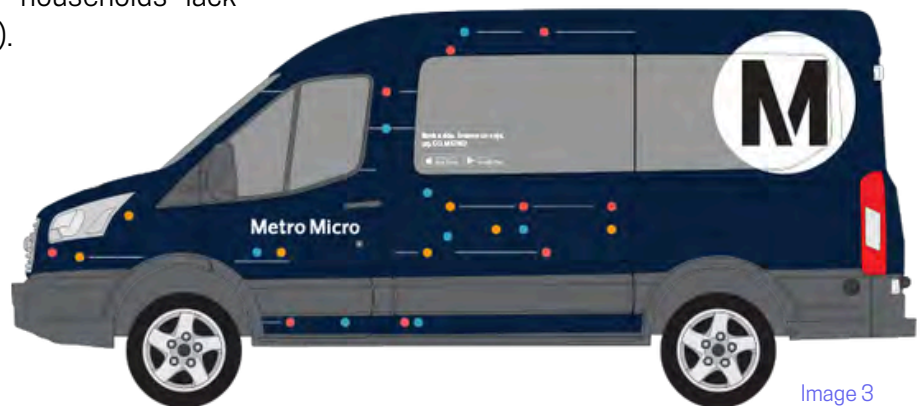

Image 3

Recommendations for Reliability & Frequency:

Increase Service Frequency and Coverage

Transit agencies need to urgently increase the frequency of high-demand routes and extend their service hours. Increasing the number of shuttle buses on routes with high commuting volume is paramount. This includes urban commuting and cross-county lines. It's also essential to prioritize more frequent service and extended hours to key destinations such as hospitals, universities, and employment centers, allowing residents to travel according to their own schedules. Agencies should focus on major transportation corridors — high-traffic routes that connect key residential and commercial areas, such as Eastern Ave., Liberty Rd., and Reisterstown Rd. Setting a minimum service frequency of every 15 minutes for buses or light rail along these corridors can significantly enhance system performance.
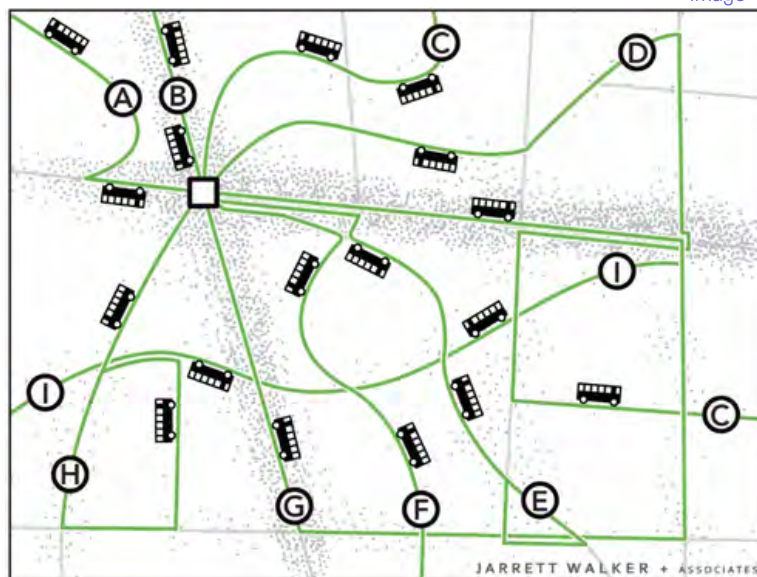
Image 4

Image 5

In terms of scheduling, the service time periods in the evening and weekends need to be expanded to meet the needs of shift workers, night travelers, and part-time students. As part of its policy advocacy efforts, UWCM could encourage local government to pilot a 24-hour bus service on key routes, to expand coverage as demand and feasibility allow gradually.

In order to ensure the stability and resilience of the system, the fleet maintenance budget needs to be increased to reduce temporary suspensions caused by vehicle failures. A backup vehicle mechanism should also be set up to quickly fill in the gaps in the event of sudden delays or during peak hours, and avoid service interruptions.

Image 6
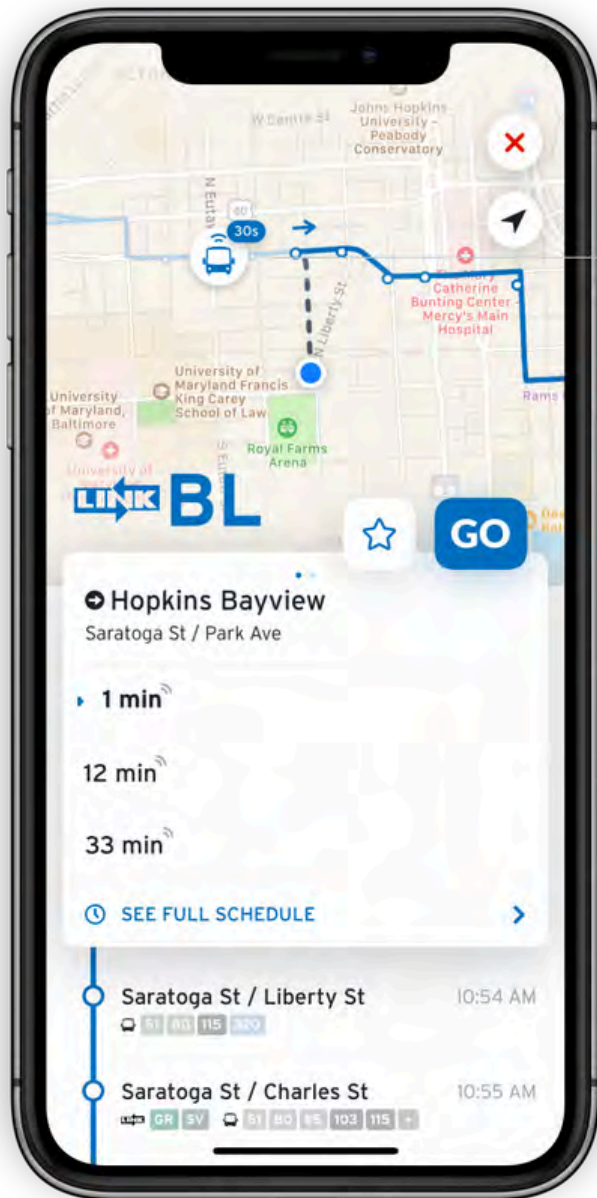
Real-time vehicle locations

Next three departures

List of stops & nearby connections

Real time information and transparency

Although Maryland has been trying to integrate and publish traffic information through the Transit App, the results are still unsatisfactory. Currently, the platform mainly relies on General Transit Feed Specification (GTFS) data, and not all operators can update this data stably and promptly (15). Therefore, when there are delays or emergencies on the route, passengers may still not be informed in time.

To address this issue, **all public transportation operators should connect their operating data to the Transit App**. The platform should publicly display key operating indicators such as the real-time location, punctuality, and fault response time of each bus. Once a delay occurs, the system must notify passengers immediately through the App or through message. At the same time, in order to improve the on-time departure rate and arrival rate, **a clear reward and punishment mechanism should be established to link operating performance with financial subsidies**. Specifically, if the company fails to meet the set punctuality target, part of the government subsidy will be deducted; conversely, if the performance indicator

is exceeded, additional rewards can be obtained. **In addition, the state government should also publish monthly bus reliability reports, publicly disclose unforeseen delays on each line, and encourage bus companies to optimize scheduling and maintenance efficiency.**

The Transit App has a companion app called Commuter Cache (formerly Incentrip), which is a transportation planning app developed by the University of Maryland (16). Michelle Martin, Planning Director of the Maryland Department of Transportation, mentioned in our interview that this app can help passengers plan their commutes. A major advantage of the app is that when users make new travel decisions that encourage them to use public transportation, they can earn reward points. These points can be redeemed for rewards such as gift cards and EasyPass points. At present, this app hasn't reached wide users. **By increasing the promotion of the benefits of Commuter Cache, the public's interest and acceptance of public transportation can be enhanced, making public transportation a more attractive option.**

Case Study: Transport for London (TfL) Open Data Initiative — Policy Background and Objectives

Transport for London (TfL) has been promoting the "Open Data Initiative" since 2010, aiming to improve the reliability and public trust of the public transportation system through data transparency. The legal basis of this policy comes from the Greater London Authority Act (1999), which requires public service agencies to maintain transparency in their operations. TfL's core strategy is to force the disclosure of real-time traffic data through technical means and use public supervision to force operators to improve services. Its core concept is that data openness can not only optimize passenger experience but also reduce public costs through market competition and technological innovation.

Logistics of of the "Open Data Initiative"

TfL's Unified Application Programming Interface （Unified API) — standardized systems that allow different software applications to communicate with each other — is the technical core of policy implementation (17). The interface is free and open to the public and provides real-time arrival information for buses and subways. Developers can access the API JSON and XML without paying licensing fees, enabling third-party applications such as Citymapper to provide real-time arrival tracking and route planning functions.

Public supervision is a key driver for policy success. After third-party applications integrate data, passengers can receive delay alerts instantly and adjust their travel plans. This mechanism puts pressure on operators - the number of passengers on routes with low punctuality rates decreases, forcing operators to prioritize repairing faults or optimizing scheduling.

Implications for Maryland

London's success has demonstrated to Maryland the feasibility and potential economic benefits of disclosing real-time traffic data. At the technical implementation level, Maryland can refer to and adopt proven and mature API architectures, which can greatly reduce system development costs and shorten trial operation time. At the legislative level, legislative amendments or franchise agreement terms should require public transportation operators to disclose real-time operating data. To ensure that the principle of fairness is maintained, policy design must customize data service functions to meet the specific needs of the ALICE population, such as providing multilingual interfaces (Spanish and Chinese) and embedding subsidy-eligible route identification in the fare inquiry system.

Image 7

Recommendations for Safety:

Creating transportation experiences that leave riders feeling safe should be at the forefront of transportation leaders' priorities. As previously mentioned, respondents noted a lack of lighting and adequate shelters as being part of the reason their transit experience does not feel safe. To remedy this, Maryland can draw inspiration from measures in Philadelphia, as noted in our literature review (18). This would include **improved and additional bus shelters at stops** across the Central Maryland region, especially in high frequency areas. MDOT has made some efforts to improve their bus stop experiences, with the "Bus Stop Design Guide" in 2019 (19), and with the "Fast Forward: Customer Experience Enhancement Project" in 2023-2024 (20). In these plans, MDOT expressed efforts to improve their stops, but made note that many amenities at stops are not in their control, but rather the responsibility of local governments or private businesses to provide them. This can create a gap in experiences for riders because of the technicality of "who's in charge of which stops". We recommend encouraging MDOT to provide assistance to even the stops they do not service, so that they are consistently updated like the rest.

This would involve **taking an inventory of the number of current bus stops** within the Central Maryland region, and noting how many are lacking shelters, and what number of existing shelters are in need of upgrades. These shelters should provide a safe and comfortable environment for riders while they wait for their bus. Philadelphia's plan noted the importance of keeping user experience top of mind in the creation of the bus shelters. We recommend the bus shelters to have the following: **proper lighting throughout the night, seating, ADA accessibility, heating, and solar power**. Additionally we suggest these shelters to have **safety buttons** similar to those seen across college campuses. This would provide a quick connection to police or help if needed. Dissatisfaction over waiting can be exasperated by instances such as standing in the rain because there is no cover at a stop. Making the changes to create proper places to wait for the bus can improve riders' sentiments of frustration towards the system.

Philadelphia's bus shelter plan also highlighted the revenue that these shelters can generate. Incorporating **advertisements attached to bus shelters** can help offset the cost of installation and provide revenue towards more transit related improvements in the long term. In addition, making them solar powered can help lower costs by using a renewable energy source, and simplify the installation process since they will not need to hook up to the existing electrical lines.

Covered & Heated

Solar Powered

Advertisements

Safety Button

Seating

Image 8

Considerations for Implementation

In a perfect world there would be no need for such a report because the necessary improvements to transportation would simply happen with little pushback. But unfortunately this is not the case. In our research we came across many iterations of challenges as to why this perfect world seems unattainable. The most common challenges are: budget, prioritization, and lack of collaboration.

Image 9

Budget:

Funding issues are the number one barrier to getting any policies with a fiscal impact enacted. The stakeholders that we've interviewed for this project pointed to the budget as the main determinant for a project's success. Although Governor Wes Moore pledged to get the Red Line project implemented before he leaves office, it is still conditional on the state legislature's allocation of funding. While other major cities have more local say in planning their transit future, Baltimore's transit systems relies on the state to decide which projects receive funding.

Governor Wes Moore's 2026 budget proposal, if approved by the General Assembly, would allocate $3.63 billion, with $775.2 million going towards transit. The Governor also recently announced the MOVE (Mobilizing Opportunities for Vital Economic Growth) Coalition, which would encompass leaders from both the public and private sector to invest in Maryland's transportation infrastructure. However, both of these plans have an emphasis on highway safety projects and bridge repairs. Although important, it is essential that the current administration remain dedicated to the rehabilitation of the Light Rail system as promised, as well as allocate funds to the additional initiatives that we've outlined in this report.

Councilwoman Christiana Rigby also mentioned the inequity of the budget dollars for transportation stating:

> *"And what is the, one of the most egregious parts, I feel, is just that the balance of those dollars, they're very heavy on the roadside and way too light on the transportation, on the transit side."*

Especially with the new presidential administration's slashing of federal funding, it is uncertain whether the Red Line project, and other similar transportation reforms, are still well-positioned to receive federal funding through the Federal Transit Administration's Capital Investment Grant (CIG) Program. While lawmakers haven't given up on the plan entirely, they have acknowledged that the Red Line is facing bigger hurdles than before. Maryland lawmakers seem to be placing the project on hold, as no legislation specifically related to the Red Line has been discussed in Annapolis as of late. However, some leaders are optimistic in a future where we have a more cooperative White House. As Del. Mark Edelson said in a Baltimore FishBowl article, "President Trump isn't going to be in office for a (full) cycle," and Maryland plans transportation spending in six-year increments. Although the Red Line may not be happening any time soon, Gov. Wes Moore is still a key proponent of elevated transit in Baltimore, recently acknowledging that "We have people who are living in just complete economic deserts because there's no transportation for them to get to jobs." Timing on these plans may have to be flexible and more long-term than initially hoped, but as highlighted in this report, accessible transportation will continue to be a worthwhile goal to fight for (20). Our recommendations are in anticipation of a future transit investment-friendly federal administration.

Image 10

Prioritization:

The lack of political will, focus or prioritization of an issue directly impacts the likelihood of change on the issue. Who is in charge matters. Especially when the state is crucial to the decision-making in terms of how much money is allocated towards transportation in the budget. When interviewing Councilwoman Christiana Rigby she mentioned some of the barriers to improving the current system, noting prioritization as one of them.

"I think our second biggest challenge is funding and lack of political will or focus or prioritization."

"I'm on the legislative side, if you don't have an administration that's pushing that, then it's hard to get it in there."

Without people making transportation a priority, it does not get the light it deserves, so having representatives like Councilwoman Rigby is important to making transit issues known. It will be important to continue to foster relationships with stakeholders within positions of power to keep the momentum going towards a transit system that works for everyone. It is also crucial to elevate why transportation should be prioritized, by highlighting the issues and real-world experiences that we've laid out in this report.

Collaboration:

During our interview with Michelle Martin (MDOT), she emphasized that a lack of interdepartmental collaboration remains a significant barrier to implementing effective transportation strategies.

"Finding the right ones to partner with is sometimes difficult. Should the solution only be transportation or should it be a broader conversation across multiple state agencies where you know you can find other creative resources...It's almost hard to get out of your lane to find them cuz you're so busy doing your critical path to be able to find those creative solutions."

Martin described this as a "silo issue".

"Yeah, it's almost like a Silo issue, right? Cuz you're like, is that the health department's issue? Is that a transportation issue? Is that an education issue? Or is it everybody's issue? But who's the one to initiate it, right?"

Without systematic collaboration and strong cross-agency leadership, even well-intentioned transportation plans may be hampered in implementation and fail to benefit their intended service populations. Therefore, it is imperative to build a collaborative governance structure that transcends traditional departmental boundaries. As mentioned previously and strongly indicated by the survey results, transit impacts all areas of life, so all sectors should have a seat at the table.

ADVOCACY TOOLS

To support UWCM in advancing equitable transportation improvements, we've compiled quick-reference tools based on our recommendations.

These resources can help streamline engagement with policymakers, community stakeholders, and transit agencies.

RECOMMENDATIONS CHECKLIST
A QUICK-REFERENCE GUIDE TO PRIORITIZE AND TRACK ADVOCACY EFFORTS.

CONNECTIVITY

- [ ] ADVOCATE FOR EXPRESS BUS ROUTES LINKING UNDERSERVED NEIGHBORHOODS TO EMPLOYMENT/EDUCATION HUBS.
- [ ] PUSH FOR AN AUDIT OF INEFFICIENT ROUTES AND REDESIGN TO MINIMIZE TRANSFERS (E.G., DIRECT NW BALTIMORE-TO-TOWSON LINE).
- [ ] SUPPORT COMPLETION OF THE RED LINE AND EXPANSION OF MARC/LIGHT RAIL WITH STOPS IN UNDERSERVED AREAS.
- [ ] PILOT MICROTRANSIT/ON-DEMAND SHUTTLES IN LOW-DENSITY AREAS (USE TINI MAP FOR PRIORITY ZONES).
- [ ] IMPLEMENT INCOME-TIERED FARE CAPS (E.G., $3/DAY MAX FOR ALICE RIDERS).

RELIABILITY & FREQUENCY

- [ ] INCREASE BUS FREQUENCY TO EVERY 15 MINUTES ON MAJOR CORRIDORS (EASTERN AVE., LIBERTY RD., REISTERSTOWN RD.).
- [ ] EXTEND SERVICE HOURS FOR NIGHT/WEEKEND SHIFTS AND PILOT 24-HOUR ROUTES.
- [ ] BOOST FLEET MAINTENANCE BUDGETS AND ESTABLISH BACKUP VEHICLE PROTOCOLS.
- [ ] MANDATE REAL-TIME TRANSIT DATA INTEGRATION (E.G., TRANSIT APP) WITH DELAY ALERTS.
- [ ] ADVOCATE FOR MONTHLY RELIABILITY REPORTS AND PERFORMANCE-BASED SUBSIDIES.

SAFETY

- [ ] INVENTORY BUS STOPS LACKING SHELTERS AND PRIORITIZE ADA-ACCESSIBLE, WELL-LIT SHELTERS WITH SAFETY BUTTONS.
- [ ] PUSH FOR SOLAR-POWERED SHELTERS WITH SEATING, HEATING, AND AD-BASED REVENUE MODELS.

IMPLEMENTATION CONSIDERATIONS

- ★ SECURE STATE/COUNTY COMMITMENTS FOR EQUITABLE ROUTE IMPROVEMENTS.
- ★ LEVERAGE FEDERAL GRANTS (E.G., FTA RURAL/SMALL URBAN GRANTS) FOR MICROTRANSIT PILOTS.
- ★ FOSTER CROSS-AGENCY COLLABORATION (HEALTH, EDUCATION, TRANSIT) TO ADDRESS SILOS.

CASE STUDY BOOKLET
HIGHLIGHTING SUCCESSFUL MODELS TO INFORM MARYLAND'S POLICIES.

Image 11

METRO MICRO IN LOS ANGELES

- *Goal:*
    - Reduce transit gaps in low-density areas.
- *Approach:*
    - On-demand shuttles ($1.75 fare) with real-time routing.
- *Impact:*
    - 40% faster commutes, 28% cost reduction for ALICE households.

TRANSPORT FOR LONDON (TFL) OPEN DATA INITIATIVE

- *Goal:*
    - Improve transparency/accountability via real-time APIs.
- *Approach:*
    - Publicly shared delay data → pressured operators to improve.
- *Impact:*
    - Punctuality rose from 68% to 85% after upgrades.

PHILADELPHIA'S BUS SHELTER PROGRAM

Image 12

- *Goal:*
    - Enhance rider safety and comfort.
- *Approach:*
    - Solar-powered shelters with ads to offset costs.
- *Impact:*
    - Increased ridership + revenue for further transit upgrades.

IMPLEMENTATION TIMELINE
A PHASED APPROACH TO TRACK PROGRESS AND MAINTAIN MOMENTUM.

Phase	Timeframe	Key Actions
Short-Term (0-12 months)	2025-2026	▪ Advocate for route audits and microtransit pilots. ▪ Launch bus shelter inventory and safety upgrades. ▪ Push for real-time data integration.
Medium-Term (1-3 years)	2026-2028	▪ Expand high-frequency corridors. ▪ Implement income-tiered fare caps.
Long-term (3-5+ years)	2028-2031	▪ Secure funding for Red Line/MARC expansion, start on Red Line completion. ▪ Regional rail expansion with new stops. ▪ Evaluate and scale successful pilots.

Next Steps for UWCM:

- Engage policymakers using the checklist and case studies.
- Continue mobilizing community input to ensure human-centered planning.
- Monitor budget allocations (e.g., MOVE Coalition, FTA grants).

These tools provide a roadmap for advocacy, ensuring UWCM can effectively push for equitable, reliable, and safe transit in Maryland.

APPENDICES

Appendix A:
Literature Review:

Abstract
 This literature review seeks to outline and assess the current transportation landscape in Maryland as well as in cities of comparable size to assist United Way of Central Maryland (UWCM) in advancing a transportation system that is human-centered and prioritizes the needs of ALICE (Asset Limited Income Constrained Employed) residents. The first part of the literature review includes recent policy initiatives around the current transportation system. The second part outlines the key priorities in addressing accessibility and equity in transportation by major transportation and peer organizations in Maryland. The final part conducts a comparative analysis between the transportation policies in Central Maryland and those in similarly sized cities to inspire policy improvements in Maryland. This literature review intends to assist UWCM in advocating for policy improvements and hastening the development of a transportation system that is more inclusive, affordable, and efficient.

Capstone Team Methodology
 The literature search was conducted from November 29th, 2024, until December 13th, 2024. The search was conducted on NYU ProQuest Central and Google. Search terms included "transportation," "Maryland," "public transit," "transit equity," "Baltimore," and "transit."
 A total of 27 studies, news articles, web pages, and reports were identified as relevant to understanding the current state of transportation in Maryland and included sources published from 2017 onwards. These sources provided valuable insights into existing systems, ongoing projects, and gaps in service that could benefit from reform. The Capstone team closely analyzed Maryland's past and present transportation plans, including state-level policy documents and local initiatives, to identify trends and opportunities for improvement.
 The Capstone Team also utilized preliminary research conducted by UWCM.

Maryland Transportation Legislation
 In recent years, the Maryland state government has attempted to address challenges such as aging infrastructure, growing transportation demand, and transportation equity through legislative support and systematic planning. The legislature has acknowledged the demand for improved transportation services and, in 2024, passed HB0950, which would require monthly funding of $80 million for the Maryland public transportation system [1]. This is a very positive signal that the state government recognizes the key role of the local operation transportation system (LOTS) in supporting residents' daily commuting and regional economic development. The fund would not only update infrastructure but also create more possibilities for disadvantaged groups to fight for equality in their daily transportation [2]. At the same time, major strides are being taken toward long-term planning in Maryland with the introduction of the 2050 Maryland Transportation Plan by the Maryland Department of Transportation, Governor Wes Moore, and Transportation Secretary Paul Wiedfeld. This strategy is focused on establishing an eco-friendly transportation system that caters to all while enhancing safety and environmental practices within the transportation sector to meet the expected local population surge of 16.28% by 2050 [3].

It involves initiatives like expanding walkways and bike paths, advocating for Transit Oriented Development (TOD) initiatives and enhancing real-time travel information systems, like MobilityLink. This plan specifically highlights the importance of "equity priority" by prioritizing services for overlooked communities to reduce social disparities in transportation services.

The legislature also passed SB891 on May 9, 2024, which proposes an independent evaluation by the Maryland Transportation Institute (MTI) at the University of Maryland to enhance MobilityLink paratransit services. This third-party review, unlike prior internal assessments by the Maryland Department of Transportation's MTA, would deliver an unbiased analysis of MobilityLink's performance, operations, and workforce practices. The study will benchmark MobilityLink against other paratransit systems nationwide, focusing on service delivery models, cost-effectiveness, reliability, and workforce indicators such as turnover rates, compensation, training, and safety. Additionally, feedback from MobilityLink users will be collected to incorporate their experiences and perspectives. MTI's findings and recommendations will be presented to state and local policymakers by July 1, 2025, providing a robust framework for improving MobilityLink's efficiency and effectiveness. This initiative is expected to generate actionable insights to ensure the service meets the needs of its riders [6].

In June 2023, Governor Wes Moore announced the relaunch of Baltimore's Red Line rail. In 2015, the project was canceled by Governor Hogan, and the funds were reappropriated to repair roads in majority-white communities [7]. A study by Johns Hopkins University found that the newly revived Baltimore's Red Line project could substantially cut travel time for people working mid-to-low-income jobs along its proposed service area, increasing access to employment. The completion of the project is now planned for after 2026 [8]. The project would expand accessibility for communities in the east and west portions of Baltimore. However, with a Republican administration about to step into the White House, with a priority to cut funding for transit expansion, the Red Line may not receive the significant federal support that it needs. On the other hand, Democrat Angela Alsobrooks' win in the Senate against former Governor Hogan could be critical to locking down any federal funding with Senate support [9].

Equity has already been an important trend in Maryland's current policies. The Equity in Transportation Sector Law, effective on June 1, 2023, and the Climate Solutions Now Act, effective on June 1, 2022, emphasize the need to prioritize underserved communities in transportation planning and projects to address environmental burdens as well as promote fairness and inclusivity in infrastructure investment and public transportation enhancements aimed at bridging the gap between urban and rural areas and various income levels.

Specific Initiatives

To achieve the goals of fairness and efficiency, the Maryland state government has taken many positive measures. These actions cover areas such as infrastructure improvements, technological innovation, and green transportation development.

First, the Maryland Department of Transportation (MDOT) actively promotes the construction of pedestrian and bicycle networks, which are important components of the 2050 transportation plan. This initiative aims to provide residents with more low-carbon travel options, especially by establishing convenient commuting routes between communities and workplaces, thereby reducing reliance on private cars. In addition, MDOT has also implemented the Pedestrian Safety Action Plan to improve the safety of walking and biking by improving road design and strengthening safety facilities [3].

In the realm of technological advancements, the state government has embraced real-time traffic information systems like MobilityLink to offer residents up-to-the-minute updates on public transportation locations while also aiding in the upkeep and supervision of accessible transport services for individuals with disabilities (paratransit). Incorporating technology doesn't just enhance the overall efficiency of the transportation system but also greatly enhances the travel experience for elderly individuals and those with disabilities [3].

Last but not least, when it comes to advancing eco-transportation options in Maryland, the Climate Solutions Now Act was enacted to provide robust backing for the adoption of electric-powered public transit systems, and cleaner sources of energy usage are on the rise. For example, the state authorities are aiming to boost the fleet of buses as part of a phased-out strategy to substitute conventional gas-guzzling vehicles [4]. This move will not just curb greenhouse gas emissions but also enhance air quality, especially benefiting disadvantaged neighborhoods and areas with high environmental stressors [2].

 Through these specific initiatives, the Maryland government hopes to find a balance between infrastructure construction, technological innovation, and green development to meet growing transportation needs while ensuring equity and sustainability of transportation services.

Challenges

 Although Maryland has made some substantial progress in improving its transportation system, it still faces many challenges in policy implementation.

 First, even though HB0950 has ensured a certain amount of funding, how to efficiently allocate and optimize the funds remains a question. It's worth mentioning that though underserved communities are often prioritized in planning, in actual implementation, these funds are often dispersed to other projects, resulting in deviations from the intended goals [4]. Second, aging infrastructure has also become a major obstacle to policy implementation. Most of Maryland's transportation facilities are in urgent need of renewal and repair. However, the current renewal speed cannot keep up with the demand for the expansion of transportation [3]. Third, the high cost of electric vehicles and the lag in the construction of charging stations make it difficult to achieve the goal of green transportation. In addition, further exploration is required to determine how the development of green transportation can benefit low-income communities [4]. Last, residents in remote areas and low-income groups may not be able to benefit from this technological innovation, like MobilityLink, due to the lack of necessary equipment due to their lack of necessary equipment, such as mobile phones [5]. If these challenges are not effectively addressed, the state government's goals in terms of fairness, sustainability, and efficiency may be difficult to fully achieve.

Transportation Organizations in Maryland

There are various government and public-led commissions in Maryland besides MDOT that are key players in past and future transportation initiatives.

 The Baltimore Regional Transit Commission (BRTC) was established through Chapter 540 of the Acts of 2023 to oversee and advocate for transit services in the Baltimore region.

Its responsibilities include reviewing and providing feedback on the annual budget proposals of the Maryland Department of Transportation - Maryland Transit Administration (MDOT-MTA), updating the Central Maryland Transportation Plan, contributing to various annual reports, and performing oversight duties. The BRTC is composed of representatives from local governments, the transportation sector, businesses, transit riders, advocacy groups, labor organizations, and members of the Moore-Miller Administration. Appointments to the commission were made by Governor Wes Moore, Baltimore City Mayor Brandon Scott, Baltimore County Executive John "Johnny O" Olszewski, Jr., Anne Arundel County Executive Steuart Pittman, and Howard County Executive Calvin Ball III (Maryland General Assembly, 2023).

The Transportation Association of Maryland (TAM), is a 501(c)(3) organization consisting of over 104 member organizations and over 20,000 individual members in public, private, and nonprofit organizations, and is committed to improving mobility and economic opportunities for all Maryland citizens. It primarily focuses on advocating for effective changes for transportation issues in the General Assembly, hosting networking and training events, and serving as a source of education and information for its members. TAM is the only statewide member-driven organization dedicated to improving community transportation [10].

The Baltimore Transit Equity Coalition is a community-led group, created with a mission to combat structural racism in public transit policy with structural change. It was born out of Governor Hogan's decision to cancel the Red Line project in 2015, a decision that impacted black and brown communities and spurred many members of the original Red Line planning committee into forming the Coalition. One of its first actions was to submit a Title VI administrative complaint to the US Department of Transportation, claiming that the cancellation violated anti-discrimination laws but was ultimately dismissed by the Trump Administration [11].

The Central Maryland Transportation Alliance, a non-profit initiative of the Baltimore Community Foundation, was created in 2007 as a coalition of corporate and civic leaders, uniting the business and philanthropic sectors behind a shared mission: transforming and expanding transportation options for the people and businesses of Central Maryland. The organization conducts an annual transportation "report card" evaluating the issues that residents face, and how Central Maryland needs to reset their priorities on behalf of citizens and businesses. Its board is composed of representatives from academia, businesses, and non-profit organizations and is sponsored by various foundations, transportation groups, and businesses such as the Maryland Transit Administration and Lyft, Inc. [12].

Current Advocacy Initiatives
Research and peer organizations of UWCM have also examined the need to accelerate the transformation of Maryland's transit system to better suit ALICE residents. According to multiple organizations' publicly available strategies, the key areas of growth to better address the needs of disadvantaged populations include:
- Addressing MTA Repair Backlog and Operator Shortage
  - Maryland transportation, particularly in Baltimore, has been characterized by insufficient operational and maintenance funding. A train operator shortage has been a more recently evolving issue, but at one point has left about a third of Baltimore's light rail operator positions vacant. Two years ago, this forced the MTA to cut the line's official weekday headways from every 10 minutes to every 15 minutes to stabilize its schedule [13,15,16].

- A recent survey conducted by the Johns Hopkins 21st Century Cities Initiative revealed that one in five residents in the Baltimore area reported having to "at least sometimes... reschedule an appointment, skip going somewhere," or face other inconveniences due to transportation issues within 30 days. The figure was significantly higher among Black residents, with approximately 43% indicating experiences of transportation insecurity [14]. Organizations have called for efforts to improve the system of repair and operations to make it more reliable and efficient, calling for improved workforce training and development for expanded service [13].
- Establishing Reliable Transportation to Job Centers
  - Inaccessibility to transit is most likely to disproportionately impact low-income and minority neighborhoods. About 30% of Baltimore residents do not have a car, compared to only 10% in the surrounding region. One particular study from the Department of Environmental Health and Engineering and the Baltimore Transit Equity Coalition found that 100% of jobs in the Baltimore region can be reached in one hour by car; only 9% of jobs can be reached by public transit in that same amount of time [17]. One organization called for the establishment of reliable bus services to regional job centers, which would broaden job opportunities for the region's residents open labor pools for employees, and for services to be offered no less than 15-minute regular services at all hours of the day [13]. Reports also identify disconnected communities, defined as neighborhoods where at least 20% of residents have a commute longer than 45 minutes in one direction and where unemployment rates exceed 5% [18]. The lack of high-frequency transit stops further complicates access, as longer service gaps inhibit timely travel. Central Maryland Transportation Alliance believes that regional transit systems should provide access to at least 25% of a region's jobs in an hour or less [17].
- Building a Clean Transportation System
  - Transportation is a significant contributor to local air pollution, responsible for over 3,000 asthma attacks, 500 preventable deaths, and $1.8 billion in combined health costs annually in Maryland [18]. Communities near the Port of Baltimore, such as Curtis Bay, are especially vulnerable to the effects of transportation emissions, experiencing higher rates of respiratory illnesses, cancer, and heart disease [19]. Possible solutions include investing in more electric buses.
  - Areas of greater need, i.e. those that are minority-populated, low-income, in Baltimore, suffer from more health issues, air pollution, and transit barriers like fewer transit stops and longer commutes. The Transit Investment Need Index (TINI) is a composite score developed to identify areas in the Baltimore region that require significant investment in transit infrastructure and is based on four themes: transit access, social vulnerability, air quality, and health. Each census tract in the region is ranked according to these themes, and the summed scores are used to create the TINI, where a higher score indicates a greater need for transit investment. The TINI map reveals a striking pattern of investment needs, particularly highlighting that the highest concentrations of census tracts in need of investment are located within Baltimore City, reflecting the historical "Black Butterfly" pattern of neglect due to redlining policies and illustrating the past of racial segregation. Reports that focus on air quality indicators, such as ozone levels and air toxic cancer risk, show that the higher levels of pollutants are concentrated where vulnerable populations live near high-traffic areas and industrial sites. Further analyses on health risks in Baltimore City focused on conditions such as asthma, cancer, and chronic obstructive pulmonary disease (COPD), linking these outcomes to both air quality and transit access and underscoring the need for improved transit options to enhance health outcomes in vulnerable populations [20, 21].

- A team at Johns Hopkins intends to use maps portraying such data to identify which areas are most in need of transit investment and make recommendations to the Maryland legislature, City Council, and the Transportation and Climate Initiative [21].
- Improving the Maryland Transit Administration's ADA MobilityLink paratransit service
  - Allied partners led by Disability Rights Maryland were instrumental in the passage of SB 891, which requires that an independent study be conducted to improve the paratransit service. Disability rights organizations have identified several issues of improvement, such as inconsistent service quality, often significantly below the standards of comparable services. For a ride to be considered "on time," it must arrive within a 30-minute window of the scheduled appointment. However, over the past seven years, MobilityLink has frequently failed to meet its 93.5% on-time performance target. In 2021, on-time performance hit a low of 59.2%, with over 38,600 instances of late pick-ups.
  - Although performance showed gradual improvement, it dropped again sharply in March 2022, falling to 73.3%. This impacts the ability of riders with disabilities to get to medical appointments, get to work on time, or attend other events [6, 23].
- Baltimore Regional Transportation Authority
  - Groups such as the Baltimore Transit Equity Coalition envision a regional governing agency, otherwise known as the Baltimore Regional Transportation Authority, where public transit decisions would be made by the people in the region. Advocates of this plan argue that historically, transportation decisions have been made with affluent folks in mind, with transportation services concentrated in white and rich neighborhoods, while residents in east/west neighborhoods have nearly double the commute time as residents in other areas of the city. By creating a regional governance system, the community could set their own budget, apply for federal funds, and choose transportation projects that best serve them [22].

Comparative Analysis of Transportation Policies in Similar Cities

To ensure best practices, it is important to compare other cities and states of similar size and demographics that have attempted transportation plans similar to Marylands' 2050 plan. For this report, Boston and Philadelphia were examined, along with independent transportation policies across the U.S.

Boston is in a similar predicament to Maryland but further along in their transportation plan which is aimed for completion in 2030 [24]. The Central Maryland region specifically is comparable to Boston, which helps parallel the transportation needs and policies between the two to the larger Maryland plan. The overarching difference noted between these two plans is transparency. While the Maryland plan outlines objectives and strategies to achieve stated goals, there is no further explanation as to how or why those strategies are listed. In Boston's plan (Go Boston 2030 ReVisioned), each proposed policy is given an extensive explanation of what was to be done, what that made better, the cost, and links to best practice examples in other cities. While these two plans give similar recommendations it is their level of transparency that makes Boston's plan more actionable in this regard. For example, both plans propose free transfers between bus/train lines for commuters. In the Maryland plan, it is only listed under the objective of "improving transportation". In contrast, in the Boston plan, the idea is integrated into specific bus and train line routes with a much more comprehensive explanation of what is being solved [3]. It is important to note that the Boston plan is only for the city, while Marylands is a statewide initiative. As officials implement Maryland's plan, learning from the Boston plan to keep the public informed on the reasonings and progress of projects would be beneficial.

Philadelphia is also implementing its transportation plan aimed for completion by 2045. Like Maryland and Boston, Philadelphia intends to improve the transit user experience. Philadelphia's plan, however, is much more deeply fleshed out in this category. Their plan states that "user-centered design goes beyond just communication". And while communication is necessary, it is the baseline of what should be expected. Not only is their transportation plan inclusive of differing experiences (ie: disability, race, gender, etc.), but it keeps in mind the entire user experience while outlining the solutions and projected impact. Philadelphia's plan considers bus shelters in depth, which is not considered in Maryland's plan. Providing shelter at bus stops does not seem to have a huge impact on a community at first, but the report outlines how it can increase ridership because of the more accommodating travel experience it creates. Additionally, the plan outlines how Philadelphia can bring in advertisement revenue from bus shelters [25].

What has yet to be explored in these policy plans but would be helpful to consider in Maryland is the incorporation of van-pooling and participatory policymaking. Van-pooling is an option to reduce traffic congestion and personal travel costs. Similar to carpooling the vanpooling system uses a shared vehicle for employees of the same company to split. Enterprise has a system nationwide that provides vehicles at a shared cost to those participating. The price is much lower than it would be for one individual using their car and additionally has environmental benefits as it reduces emissions through reduced car usage [26].

Participatory policymaking gives the community the power to make choices on what projects/policies are being implemented in their neighborhoods. The most common way this is executed is through participatory budgeting. In New York City, 24 city council members use the practice to have residents decide how their discretionary funds are spent. This practice, founded in Porte Alegre, Brazil, in 1989, increases community satisfaction by giving them a tangible stake in the work. Community members can bring proposals forward and vote on which funds should be awarded [27]. To create more community buy-in for the 2050 plan, it would be beneficial to include this practice.

All of the plans analyzed, including the Maryland 2050 plan, included language and intentions of improving equity in transportation. As previously mentioned, while setting intentions is necessary to inform the public, consistency in implementation is even more important. Following through on promises while also staying transparent with progress is key to maintaining public trust.

Interview Protocol:

- Interview Invitation Email
  - Subject: Invitation for Expert Insight on Enhancing Central Maryland Transportation
  - "Dear [Interviewee's Name],
  - I hope this message finds you well. My name is _____, and I am an NYU Wagner student consultant reaching out on behalf of the United Way of Central Maryland (UWCM), a committed advocate for improving community infrastructure and support systems throughout Maryland. We are currently undertaking a comprehensive review of Central Maryland's transportation strategies to better serve those who are Asset-Limited, Income-Constrained, and Employed (ALICE) and ensure the transportation network is inclusive, affordable, and efficient. Given your work with (insert a specific connection to transportation here: MDOT, Transit Choices, etc.), we would appreciate the opportunity to conduct a 60-minute virtual interview with you to gain your insights on the current and future state of transportation in Central Maryland. This discussion will focus on current policies and innovative solutions that could transform the transportation landscape to meet the community's needs. Please let us know your availability for a one-hour virtual interview between February 5th and 20th. We are flexible and will work around your schedule to facilitate this important dialogue. Thank you for considering this invitation. Your participation would be invaluable to our efforts, and we look forward to your collaboration in creating a more equitable transportation system.
  - Warmest regards,"
- Follow-Up Invitation Email
  - Subject: Follow-Up: Invitation for Expert Insight on Enhancing Central Maryland Transportation
  - "Dear [Interviewee's Name],
  - I hope you are doing well. I am following up on my previous invitation to participate in a 60-minute virtual interview on behalf of the United Way of Central Maryland (UWCM) regarding the future of transportation in Central Maryland. We would greatly appreciate your insights, and we remain flexible in scheduling the interview to accommodate your availability between February 5th and 20th. Please let us know if there is a convenient time for you, and we will send a calendar invitation accordingly. If you have already responded and I somehow missed your message, I apologize for the inconvenience. Thank you again for considering this invitation, and we are eager to hear your valuable perspectives.
  - Looking forward to your response.
  - Warmest regards,"
- Interview Confirmation and Reminders
  - Subject: United Way of Central Maryland - Confirming Your Participation in the Transportation Improvement Interview
  - "Dear [Interviewee's Name],
  - Thank you for agreeing to participate in our upcoming interview regarding transportation improvements in Central Maryland. We look forward to your valuable insights and are confident that your contributions will enhance our efforts. You should have received a calendar invitation with the following details.
    - Interview Details:
      - - Date:
      - - Time:

- - Duration:
- - Zoom Link:
  - If you have any questions or need to make adjustments to the schedule, please feel free to contact me directly at_____. Thank you again for your willingness to share your expertise. We appreciate your commitment to improving Central Maryland's transportation system.
  - Best regards,"

Appendix C
Interview Structure and Questions:
*Interviews will be one-hour maximum
1. Introduction (5 minutes):
   - Introduce ourselves, our project, and the purpose of the interview.
     - "Good _____, Thank you for taking the time, my name is _____, and these are my team members _____ and _____. We are members of the NYU Capstone team working with United Way of Central Maryland to assist them in transportation solutions to improve the experience for ALICE (Asset- Limited, Income Restricted, Employed) residents. We are grateful to have the opportunity to speak with you today to gain your insight on the subject of transportation in Central Maryland."
   - Provide an overview of how the interview insights will be used (e.g., to inform strategies for transportation equity, improve transit experiences, etc.).
     - "What we learn from the interview today will be used to inform the strategies and suggestions we compile to improve transportation experiences in Central Maryland on behalf of UWCM."
   - Inform the participant upfront about the following:
     - "Before we begin, I want to inform you of a few things. First, _____ [name of the note-taker] will be taking notes to capture your responses accurately. Second, your responses will be anonymized. If they are not, we will share them strictly with our client for this project and will not disclose any identifying information. What's more, the interview is expected to last one hour. Do you have any questions before we start? We are more than happy to elaborate on that. "
2. Warm-Up Questions (5 minutes):
   - Could you briefly describe your role and how it relates to transportation in Central Maryland?
   - What communities do you serve or represent, and what are the main transportation challenges you see in such communities?
3. Core Questions (30–40 minutes):
   - What are some of the current barriers to improving transportation for the communities you serve?
   - What areas of research would help improve transportation for disadvantaged communities?
   - In your view, how do transportation challenges intersect with housing?
     - What about employment opportunities?
     - Are there any other areas you think are impacted?
   - What role should community-based organizations, such as UWCM, play in shaping transportation solutions?
     - What top action can UWCM take to support improving transportation for the communities you serve in Maryland?
   - What innovative ideas or technologies do you think could be leveraged to address transportation challenges in Maryland?

- What key transportation policies or initiatives have you or your organization championed or supported in the last 5 years/during your time in office?
- What metrics or benchmarks do you use to evaluate the success of transportation policies?
- How does your organization/agency gather feedback or data on the needs of residents who are struggling to make ends meet? And how flexible is your approach in adjusting strategies based on that information?
- In your opinion, what are the top three transportation priorities for Central Maryland over the next five years?
- How can policymakers balance the needs of urban, suburban, and rural areas in transportation planning?
- How does your department/agency/office measure the impact of transportation policies on disadvantaged populations?
- What strategies are being planned to ensure language accessibility for residents in transportation planning and operations?
- What specific initiatives are planned to increase transit, carpool, and vanpool options to connect communities to key employment centers effectively?
  - How do ALICE (or Asset Limited, Income Constrained, Employed) residents and other underserved members of the community play into these strategies?

For community partners and organizations (such as Baltimore Transit Choices):

- What specific transportation-related programs, initiatives, or advocacy efforts is your organization currently involved in?
- How does your organization collaborate with local governments, transit agencies, or other community groups to address transportation challenges?
- What advocacy strategies have been most effective in driving legislative support for your initiatives?
- Have you read the 2050 Maryland Transportation Plan or the long-range transportation plan developed by the Baltimore Regional Transportation Board (BRTB)? It focuses on expanding transit options, improving pedestrian and bicycle infrastructure, enhancing road capacity, and prioritizing sustainability and resilience in the face of climate change challenges. Key aspects include significant investments in new transit lines, roadway improvements, and initiatives to promote walking and biking, all aimed at creating a more connected and environmentally friendly transportation system for the Baltimore area. What is your perspective on the 2050 plan and how it will impact/improve Central Maryland transportation?
  - What are the top three initiatives that you feel should be made a priority?
  - Are there any initiatives that you think need to be adjusted, and how?
- How do you anticipate the new presidential administration impacting the 2050 plan?
  - How might it impact federal funding or priorities?

4. Closing (5–10 minutes):

- Do you have any final thoughts or insights on transportation in Central Maryland that we haven't discussed?
- Who would you recommend we speak with to gain additional perspectives on improving transportation policy in Maryland?
- "Thank you so much for your time and valuable insights. We truly appreciate your contribution to our project."

Thank the interviewee(s) for their time and insights.
Thank you email to be sent within 24 hours after the interview

Interview Thank you email:
- Subject: United Way of Central Maryland - Thank you for your time
  - "Dear [Interviewee's Name]
  - Thank you for taking the time to meet with us and discuss the issues related to transportation in Central Maryland. Your insights are invaluable as we tackle this project. From here, we will be analyzing the information we have gathered as we move to the next phase of our project. When the project is complete (early May) we would love to share with you our final project.
  - Best,"
- Transcription and Notes:
  - Transcribe the interview and summarize key points.
  - Highlight themes, notable quotes, and actionable recommendations.
- Thematic Analysis:
  - Categorize responses under common themes, such as barriers, impacts, gaps, and solutions.
- Follow-Up:
  - Send a thank-you email to the interviewee and share the next steps for the project. Send the interviewee a copy of the final project when ready.

Appendix D

Interview Codebook:

Issues with transportation	The shortcomings with the current transportation system
affordability	Ability of residents to pay for varying modes of transportation (ex: bus fares, costs of own vehicle, etc.)
Personnel	Issues with staffing of transportation infrastructure, including hiring staff and paying for said staff
reliability	The level that a person can count on or not count on their mode of transportation in a trip
safety	The reason a rider would not use public transportation due to the threat of it being hazardous
Impacting other areas of life	When transportation impacts and is impacted itself because of other factors
education	Where the fault in transportation causes a barrier in accessing education
employment	Where the fault in transportation causes a barrier in accessing employment
health	Transportation creating both personal health issues and larger environmental issues
housing	The relationship between housing and transportation
Feasibility for change	The limits of the possibility of the current system changing
administration challenges	Barriers keeping the administration from making changes to the transportation system
budget	The fiscal constraints on the administration from making changes to the transportation system
infrastructure	The challenges of the current infrastructure to be changed
Positive impacts with change	The suggested improvements to the transportation system

Survey Protocol:

Purpose of the Survey
The survey aims to gather insights from residents of Central Maryland about their transportation needs, preferences, and barriers. The results will inform strategies to improve accessibility and equity in Central Maryland's transportation system, particularly to improve the experience for ALICE (Asset- Limited, Income Restricted, Employed) populations, focusing on how transportation challenges intersect with other areas of life, such as employment, healthcare, and education.
Survey Design
The survey is divided into four main sections:
- Demographic Information: To understand the background and unique characteristics of participants.
- Transportation Needs and Preferences: To identify common transportation behaviors, challenges, and priorities.
- Intersectionality and Broader Impacts: To explore how transportation issues affect other aspects of participants' lives.
- Suggestions and Final Thoughts: To gather recommendations for improving transportation systems.

Survey questions include a mix of multiple-choice, ranking, and open-ended formats to allow both quantitative and qualitative analysis.

Target Population and Distribution Method
The survey targets residents of Central Maryland to gather information that will inform transportation solutions to improve the experience for ALICE (Asset-Limited, Income Restricted, Employed) populations.

Ethical Considerations
- Voluntary Participation: Your participation in this survey is completely voluntary. You may withdraw from the survey at any time without any consequences.
- Informed Consent: By participating in this survey, you will provide valuable insights to help improve transportation in Central Maryland. The information you provide will inform strategies and recommendations for better transportation solutions for residents. We will explain the purpose of this survey and how your responses will be used before your participation.
- Confidentiality: All responses will remain anonymous. We will not collect any personal identifying information, and the data you provide will only be shared in aggregate form. Your answers will not be linked to you, and your responses will be kept strictly confidential. Only the NYU Capstone team (Sarah Carmona, Tianyi Wang, Connie Rachel Wu) will have access to these responses.

Estimated Completion Time
The survey is designed to take approximately 5-10 minutes to complete.

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Appendix F

Survey Questions:

Section 1: Demographic Information

What is your age?
- *Under 18*
- *18–24*
- *25–34*
- *35–44*
- *45–54*
- *55–64*
- *65+*
- *Prefer not to say*

What is your gender?
- *Male*
- *Female*
- *Non-binary/Third gender*
- *Prefer not to say*

What is your annual household income?
- *Less than $20,000*
- *$20,000–$39,999*
- *$40,000–$59,999*
- *$60,000–$79,999*
- *$80,000-$99,999*
- *$100,000-$119,999*
- *$120,000 or more*
- *Prefer not to say*

How many people, including yourself, live or stay in your home?
- *1*
- *2*
- *3*
- *4*
- *5+*
- *Prefer not to say*

How many children under the age of 18 live in your household?
- *1*
- *2*
- *3*
- *4*
- *5+*
- *Prefer not to say*

Do you identify with any of the following groups? (Select all that apply)
- A person with a disability
- Immigrant or refugee
- Limited English proficiency
- Other (please specify)
- Prefer not to say

What is your primary mode of transportation?
- Personal vehicle
- Bus
- Train (light rail, heavy rail, subway, trolley, etc).
- Bicycle
- Walking
- Rideshare (Uber/Lyft/taxi)
- Other (please specify)
- Prefer not to say

Do you use more than one mode of transportation regularly?
- No
- Yes (please specify)
- Prefer not to say

Section 2: Transportation Needs and Preferences

How often do you use public transportation?
- Daily
- Weekly
- Monthly
- Less than monthly
- Never
- Prefer not to say

Section 2 continued:

Do you encounter any of the following challenges when using public transportation? (Select all that apply)
- Cost of fares
- Lack of nearby stops/stations
- Safety concerns
- Long wait times
- Unreliable schedules
- Inaccessible vehicles or stations
- Other (please specify)
- Prefer not to say

How important are the following factors in your transportation experience? (Rate from 1 = Not Important to 5 = Very Important)
- Affordability
- Reliability
- Accessibility for disabilities
- Proximity to home/work/school
- Safety
- Environmental sustainability

Rate your level of agreement with the following statement: "*I feel that the current transportation options meet my current needs.*"
- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree
- Prefer not to say

Rank the following potential improvements to public transportation based on what you feel is most needed (1 = Most Needed, 5 = Least Needed):
- Lower fares
- Free transportation
- More frequent service
- More reliable service
- Improved safety measures
- Accessibility upgrades for disabilities
- Expanded routes and coverage

Section 3: Intersectionality and Broader Impacts

as your access to transportation impacted any of the following areas of your life? (Select all that apply)
- *Employment opportunities*
- *Access to education*
- *Access to healthcare services*
- *Ability to purchase groceries and other necessities*
- *Social connections and community engagement*
- *Prefer not to say*
- *Other*

If you use transportation for work commuting purposes, how long is your average commute?
- *Less than 15 minutes*
- *15–29 minutes*
- *30–44 minutes*
- *45–59 minutes*
- *Over 1 hour*
- *Non-applicable*
- *Prefer not to say*

How do transportation costs affect your overall financial well-being?
- *No impact*
- *Slight impact*
- *Significant impact*
- *Other (please specify)*
- *Prefer not to say*

Rate your level of agreement with the following statement: "Transportation barriers disproportionately affect certain groups in my community."
- *Strongly Disagree*
- *Disagree*
- *Neutral*
- *Agree*
- *Strongly Agree*
- *Prefer not to say*

Section 4: Suggestions and Final Thoughts (optional)

- *Are there any additional transportation challenges or concerns you would like to share?*
- *What improvements would you like to see in public transportation in Central Maryland?*

Quantitative Survey Findings

 To inform UWCM of how to approach transportation issues, we had to gather information from those most directly impacted, the citizens of Central Maryland using the current transportation system. Using the Voter Voice system through UWCM, we sent our survey directly to Central Maryland community members. The survey was live for one month and was pushed to the VoterVoice contacts three times. From this, we received 185 responses, which included a mix of quantitative and qualitative data.

 The following report mainly covers the quantitative survey results. We will use charts to visually present the following contents, including: Demographic Information of respondents, Transportation Needs and Preferences, and Intersectionality and Broader Impacts of the transportation system in Maryland.
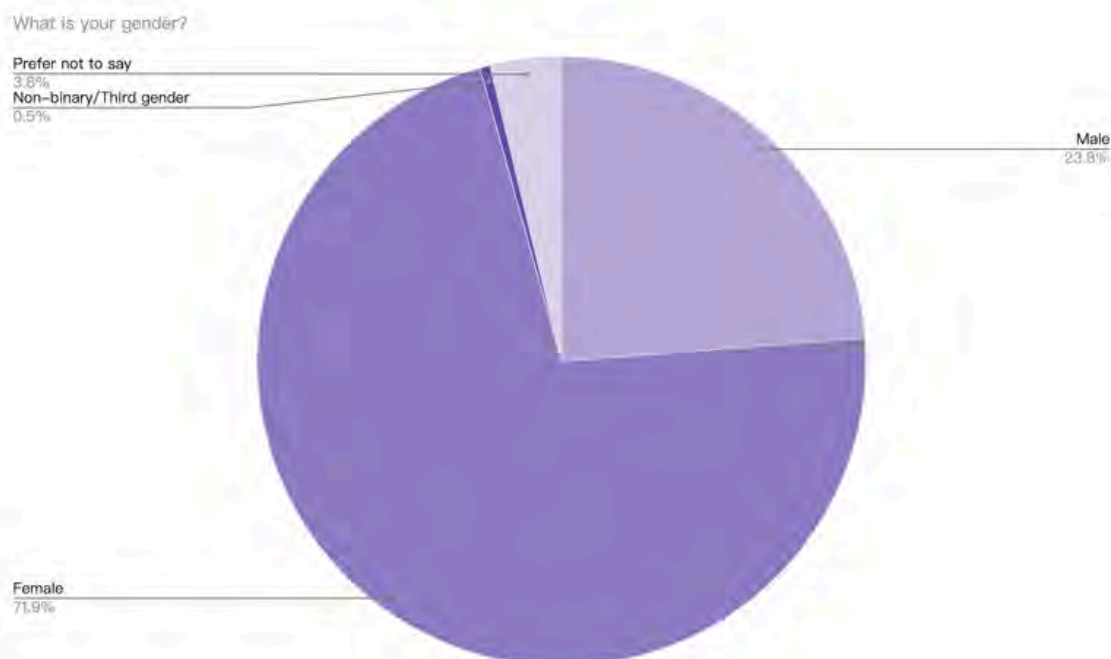
Demographic Information
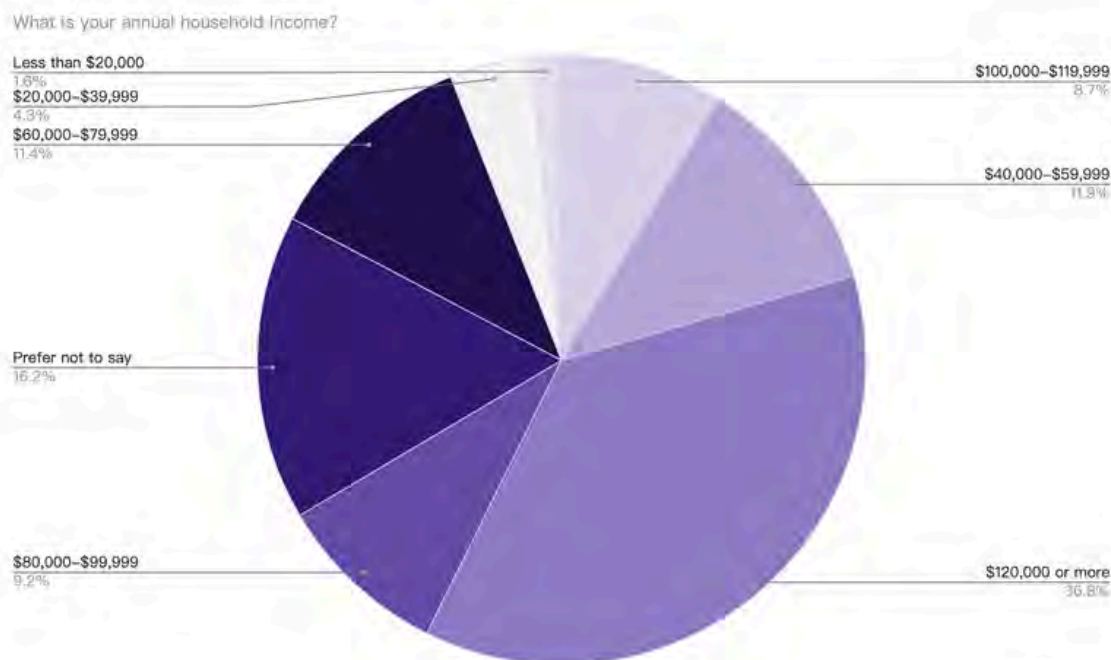- *Age Distribution*
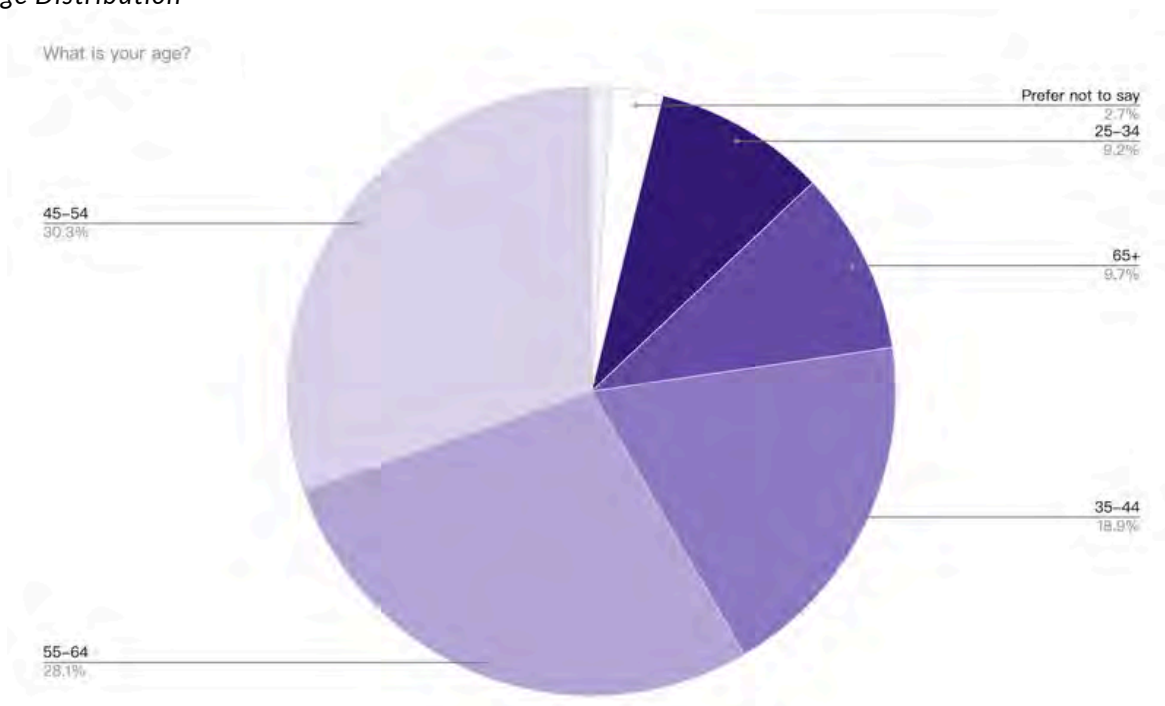
Most respondents (58.38%) are aged 45-64 (30.27% in 45-54, 28.11% in 55-64). Younger demographics (18-24) are minimally represented (1.08%), with 2.7% declining to disclose their age.

- *Gender Distribution*

What is your gender?

Prefer not to say
3.8%
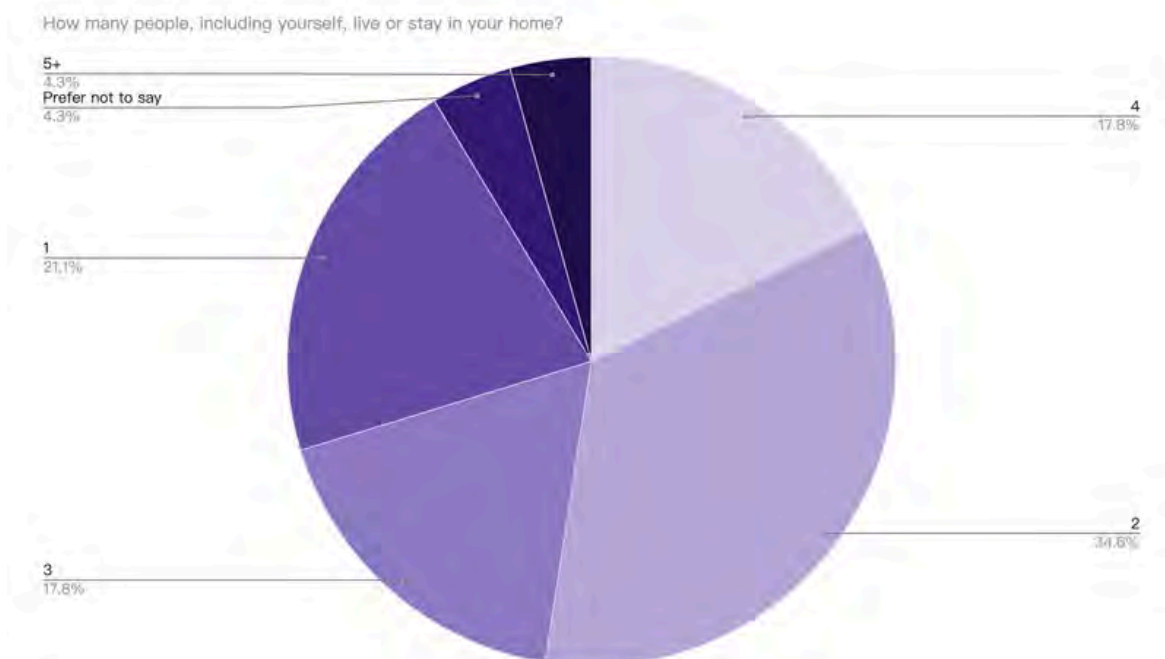Non-binary/Third gender
0.5%

Male
23.8%

Female
71.9%

Female respondents dominate (71.89%), vastly outnumbering males (23.78%). Non-binary/third-gender representation is minimal (0.54%), with 3.78% declining to disclose gender.

- *Annual household income*

What is your annual household income?

Less than $20,000
1.6%
$20,000–$39,999
4.3%
$60,000–$79,999
11.4%

$100,000–$119,999
8.7%

$40,000–$59,999
11.3%

Prefer not to say
16.2%

$80,000–$99,999
9.2%

$120,000 or more
36.8%

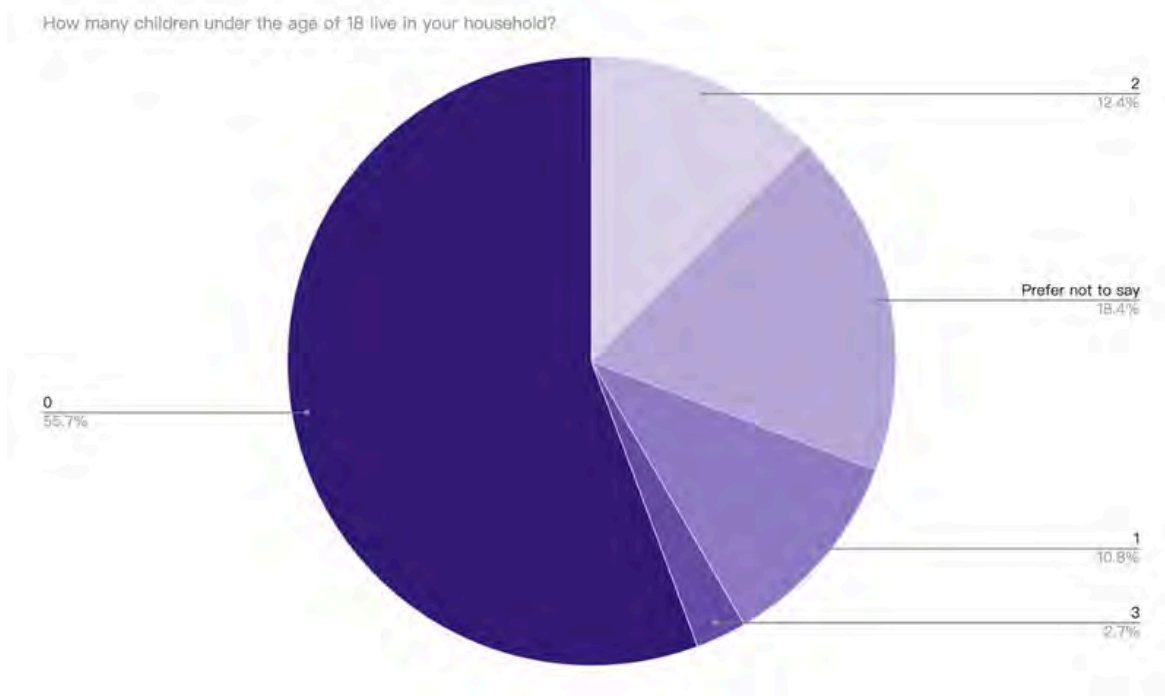36.76% of respondents reported earning over $120,000 annually, while 16.22% chose not to disclose their income. Mid-tier earners, with annual incomes between $40,000 and $99,999, made up 32.43% of the sample. In contrast, only 1.62% of respondents reported earning less than $20,000, indicating that the sample is skewed toward higher-income groups and may not fully capture the experiences of lower-income populations.

- *Household Size Distribution*

How many people, including yourself, live or stay in your home?

5+
4.3%
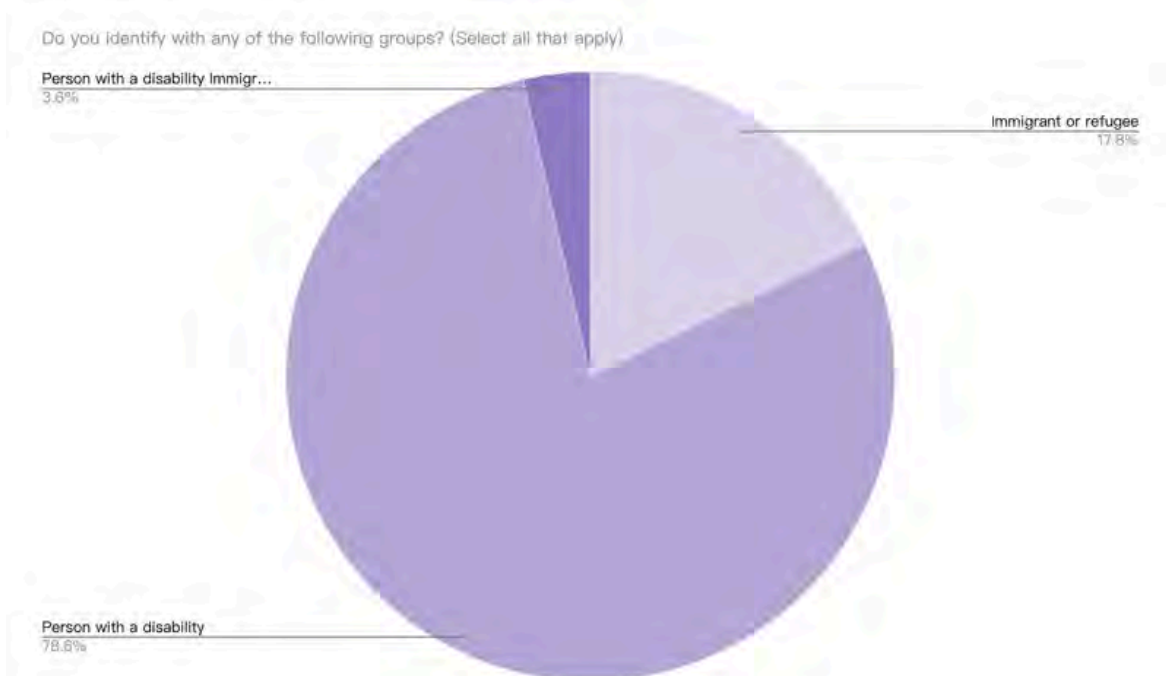Prefer not to say
4.3%

4
17.8%

1
21.1%

2
34.6%

3
17.8%

2-person households dominate (34.59%), followed by 1-person (21.08%). Over 90% reported household sizes of 1-4 people, with only 4.32% (8) declining to disclose.

- *Children Age Distribution*

How many children under the age of 18 live in your household?

2
12.4%

Prefer not to say
18.4%

0
55.7%

1
10.8%

3
2.7%

55.68% of respondents reported having 0 children, vastly outnumbering those with 2 children (12.43%). A notable 18.38% declined to disclose, suggesting sensitivity around household child demographics.
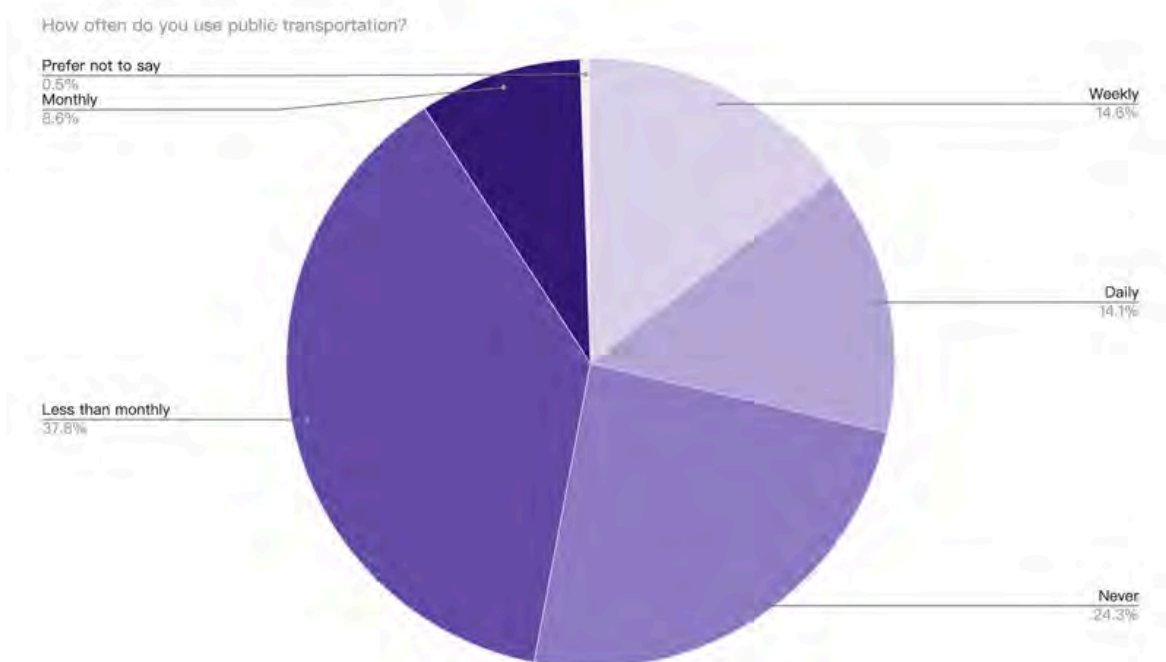
- *Identity*

Do you identify with any of the following groups? (Select all that apply)

Person with a disability Immigr...
3.6%

Immigrant or refugee
17.8%

Person with a disability
78.6%

11.89% reported having a disability, while immigrant/refugee identities are rare (2.7%). A notable 17.3% preferred not to disclose their identity.

Transportation Needs and Preferences
- *Transportation Frequency*

How often do you use public transportation?

Prefer not to say
0.5%
Monthly
8.6%

Weekly
14.6%

Daily
14.1%

Less than monthly
37.8%
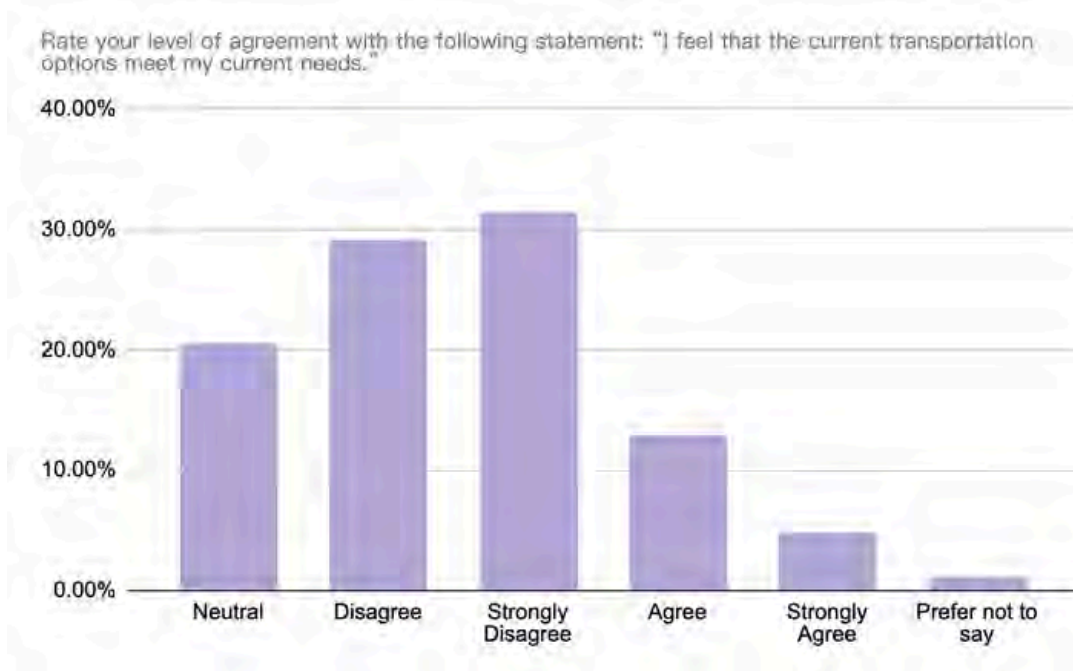
Never
24.3%

Low reliance on regular transit: Only 28.64% use transportation daily/weekly, while 62.16% (less than monthly/never) rarely or never rely on it, signaling underutilized or inadequate public transit systems.

- *Public Transportation Challenges*

Do you encounter any of the following challenges when using public transportation?

Inaccessible vehicles or stations
4.2%

Cost of fares
7.7%

Unreliable schedules
25.8%

Lack of nearby stops/stations
20.7%

Safety concerns
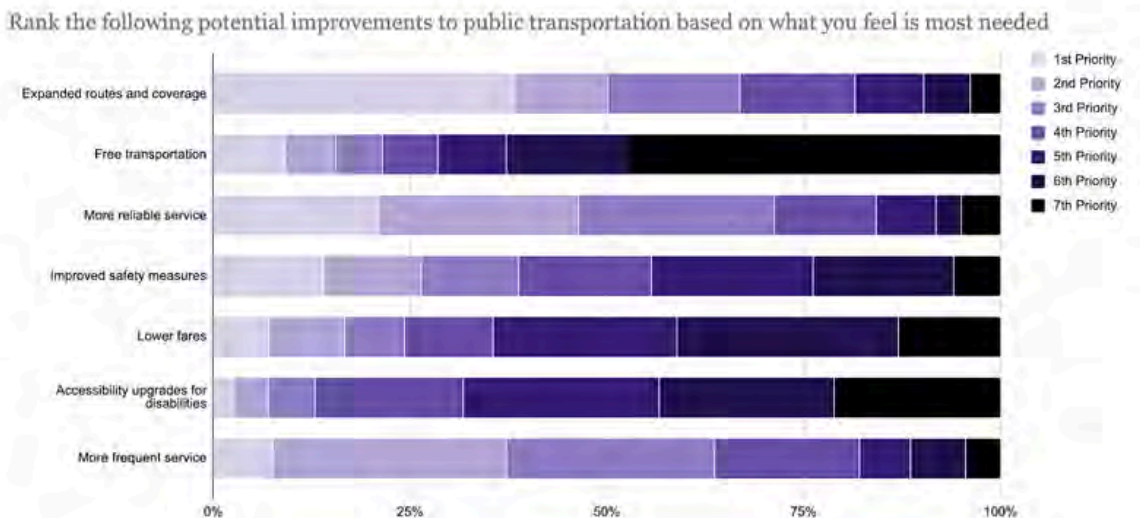20.1%
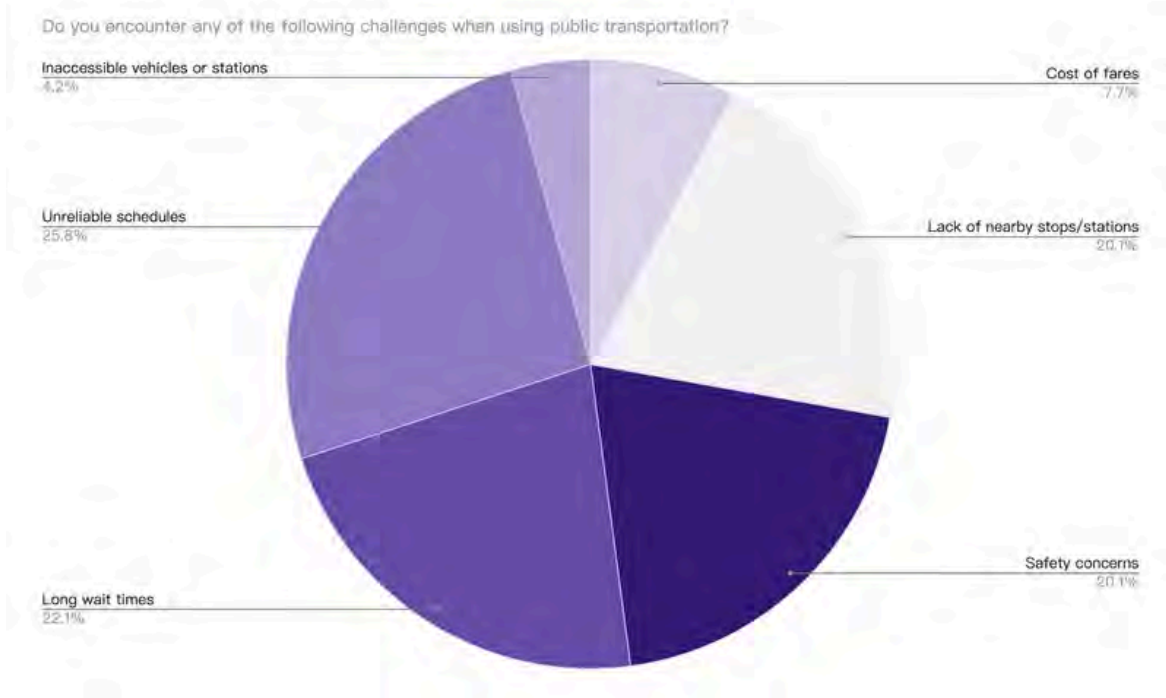
Long wait times
22.1%

Survey responses reveal that the top challenges faced by public transit users are unreliable schedules (25.8%), long wait times (22.1%), and safety concerns (20.1%). These findings highlight three critical problem areas—reliability, connectivity, and safety—underscoring the need for a transportation system that is not only efficient and timely, but also secure and accessible for all riders.

- *Satisfaction Level*

Rate your level of agreement with the following statement: "I feel that the current transportation options meet my current needs."

Over 60% of respondents (31.35% Strongly Disagree, 29.19% Disagree) express dissatisfaction with current transportation options, signaling systemic inadequacies. Positive responses (Agree/Strongly Agree) are minimal (17.83%), while 20.54% remain neutral, highlighting widespread unmet needs and ambivalence toward local transit services.

- *Necessity Rating*

Rank the following potential improvements to public transportation based on what you feel is most needed

"Expanded routes and coverage" was selected as the top priority by the most respondents (the lightest color accounted for the largest proportion), indicating that lack of connectivity is the most urgent problem in the current system. This also echoes the views expressed by respondents in other parts of the questionnaire, such as "the destination is difficult to reach" and "the distribution of stations is unreasonable". "More reliable service" and "More frequent service" also have a large number of first, second, and third priority votes, indicating that respondents are highly concerned about the punctuality and density of the schedule, emphasizing the concern about the reliability and frequency of public transportation. Although "Improved safety measures" did not rank first, a considerable proportion of respondents still ranked it as the second or third priority, showing that the impact of lack of safety on transportation choices is still significant.
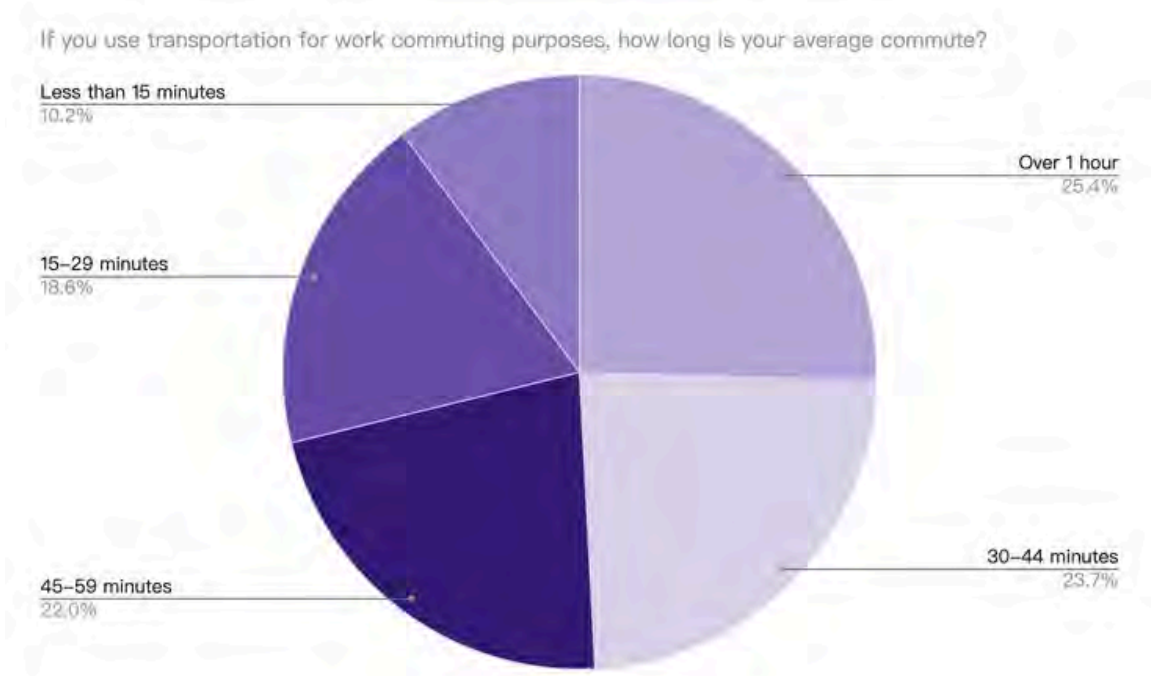
Intersectionality and Broader Impacts
- *Broader Impacts*
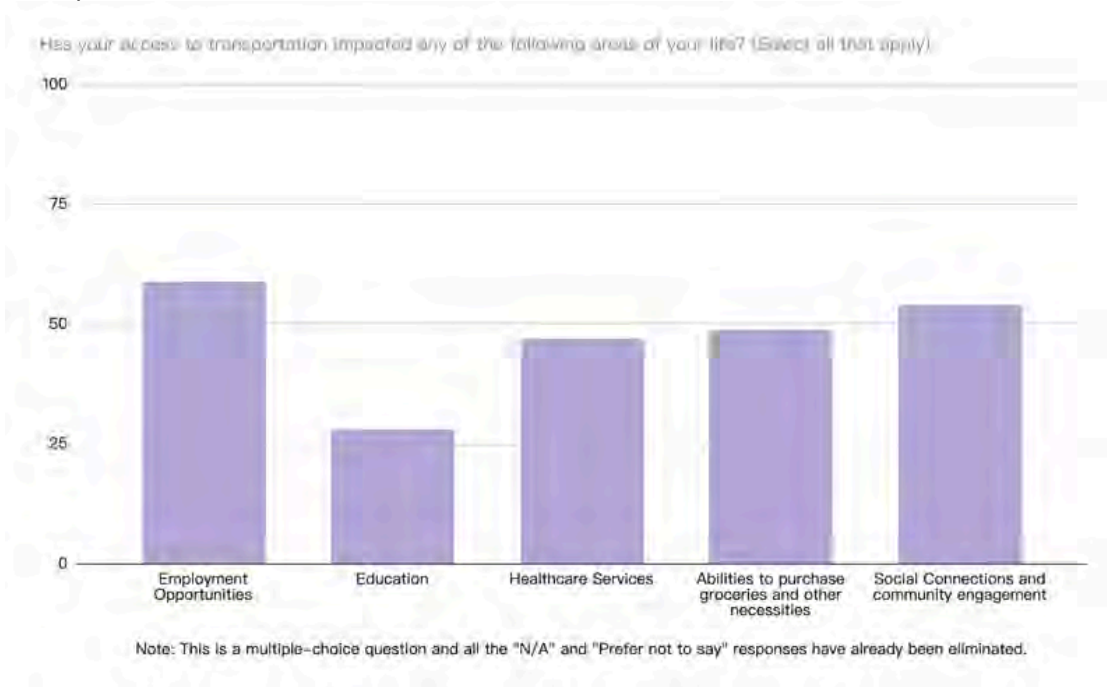
Note: This is a multiple-choice question and all the "N/A" and "Prefer not to say" responses have already been eliminated.

After eliminating all N/A and "Prefer not to say" responses, we found that the largest number of respondents (59) said that transportation affected their employment opportunities, followed by social connections and community engagement (54), the ability to purchase groceries and other necessities(49), access to healthcare services(47), and education opportunities (28). Overall, insufficient transportation connectivity has significantly affected all aspects of residents' lives, which further confirms the uneven investment revealed by the Transit Investment Need Index (TINI).

- *Commute Time Distribution*

If you use transportation for work commuting purposes, how long is your average commute?

Less than 15 minutes
10.2%

15–29 minutes
18.6%

45–59 minutes
22.0%

Over 1 hour
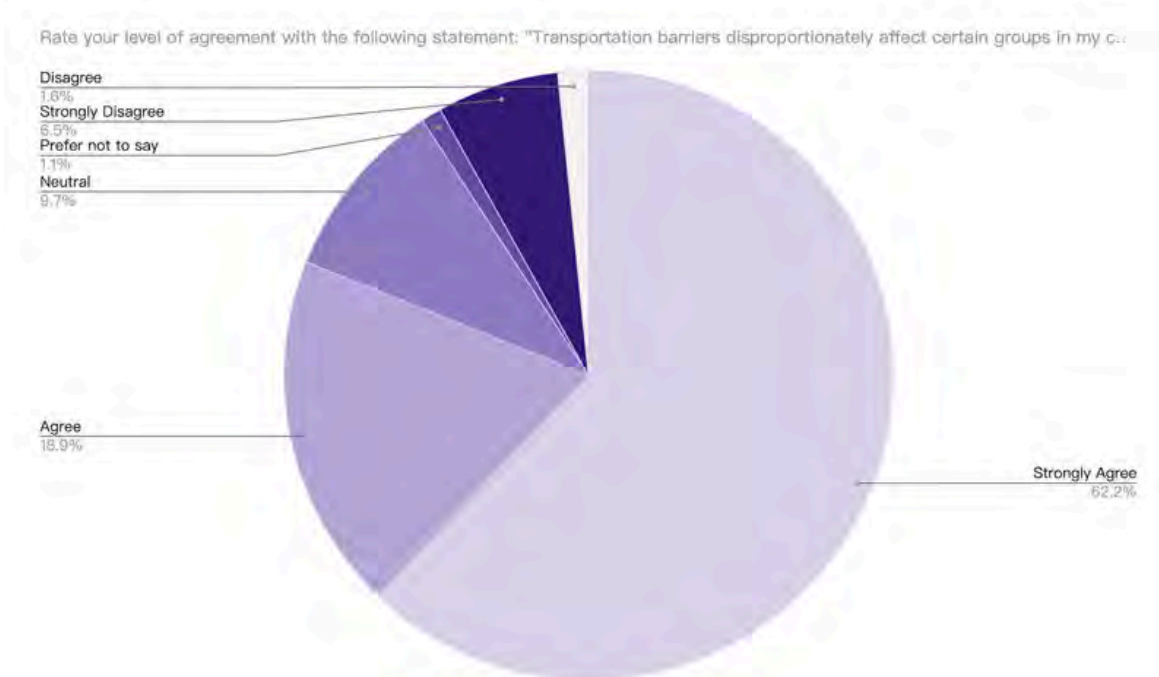25.4%

30–44 minutes
23.7%

35.68% report no commute (non-applicable), while 16.22% endure lengthy commutes over 1 hour, highlighting stark disparities in transportation reliance. Short commutes (under 30 minutes) account for 18.38%, reinforcing systemic inefficiencies in accessible transit for daily needs.

- *Financial Wellbeing Distribution*

How do transportation costs affect your overall financial well-being?

Other (please specify)
1.6%
Prefer not to say
2.7%

Slight impact
38.9%

Significant impact
23.8%
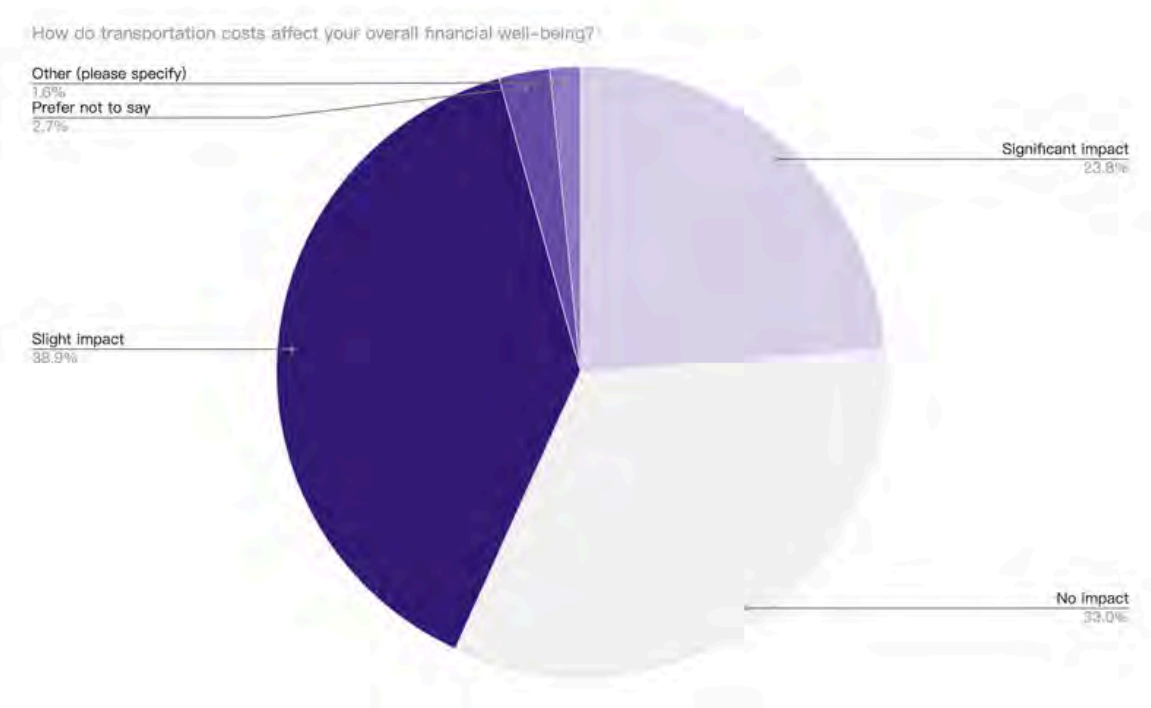
No impact
33.0%

38.92% report slight financial strain from transportation costs, while 23.78% experience a significant impact, indicating widespread economic pressure. A notable 32.97% feel no impact, reflecting socioeconomic disparities in transportation affordability.

- *Transportation Barriers*

Rate your level of agreement with the following statement: "Transportation barriers disproportionately affect certain groups in my c..."

Disagree
1.6%
Strongly Disagree
6.5%
Prefer not to say
1.1%
Neutral
9.7%

Agree
18.9%

Strongly Agree
62.2%

62.16% strongly agree that transportation barriers disproportionately affect certain groups, with 18.92% agreeing, reflecting near-universal recognition of systemic inequities. Opposition is negligible (8.11% combined disagree/strongly disagree), reinforcing the urgency to address these accessibility gaps.

Appendix H

Survey Codebook:

Accessibility	The ability to use or not to use transportation due to certain barriers
frequency	Frequency of transit coming
connectivity/location	Certain areas not being connected to transportation, lack routes to their needed destination or their house, or do not have enough options. Describes long commute time due to lack of connectivity.
options	Choices of transportation, more buses/trains
Affordability	Describes issues with being able to afford or pay for transportation
Reliability	Describes transportation being dependable.
Speed	Public transportation is too slow
Safety	Describes situations when taking public transportation where they feel unsafe
Transparency	Describes a lack of accurate communication about schedules
Impacts on other areas of life	When transportation impacts and is impacted itself because of other factors
jobs	Describes issues with transportation impacting their ability to commute to work.
housing	Describes the lack of accessible housing, leading to a dependency on public transportation
education	Describes issues with transportation impacting commute to school
Health/Pollution	Describes concerns over excess pollution/smoke emissions from transportation

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