Implementation and Evaluation of Aira Access Pilot Run in Connecticut

Final Report

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Report No:
CT-2325-F-23-**3**

June 14, 2023

Research Project:
SPR-2325

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Connecticut Transportation Institute
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Submitted to:
Connecticut Department of Transportation
Bureau of Policy and Planning
Research Section

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TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. CT-2325-F-23-3	2. Government Accession No.	3. Recipients Catalog No.
4. Title and Subtitle Implementation and Evaluation of Aira Access Pilot Run in Connecticut		5. Report Date June 14, 2023
		6. Performing Organization Code SPR-2325
7. Author(s) Mohammad Razaur R Shaon; Niloufar Shirani; Eric Jackson		8. Performing Organization Report No.
9. Performing Organization Name and Address Connecticut Transportation Safety Research Center University of Connecticut 270 Middle Turnpike Unit 5202 Storrs, CT 06269-5202		10. Work Unit No. (TRIS)
		11. Contract or Grant No. SPR-2325
		13. Type of Report and Period Covered Final Report May 21, 2021 – June 30, 2023
12. Sponsoring Agency Name and Address Connecticut Department of Transportation 2800 Berlin Turnpike Newington, CT 06131-7546		
		14. Sponsoring Agency Code
15. Supplementary Notes A study conducted in cooperation with the U.S. Department of Transportation, Federal Transit Administration.		

16. Abstract

The goal of this project is to implement Aira, one of the fastest-growing assistive technology options for people who are blind or have low vision, across the entire State of Connecticut, to be used for navigation, wayfinding, riding public transportation, and to ensure proper social distancing for blind-low vision (BLV) individuals. The University of Connecticut (UConn) project team conducted pre- and post-user surveys to understand travel patterns and barriers faced by visually-impaired individuals in Connecticut. The survey results provided valuable insights into the needs and barriers faced by the visually-impaired community while using public transportation or conducting daily activities. The BLV participants for the pilot implementation were selected from the Blind Registry maintained by the Bureau of Education and Services for the Blind (BESB) within the Connecticut Department of Aging and Disability Services (ADS). Aira also provides a real-time dashboard with qualitative and quantitative information regarding the service provided by Aira. An evaluation of the Aira service usage was conducted by the UConn project team to identify changes in reported mobility to make recommendations on how the state may support these services in the future.

17. Key Words Assistive technology, Aira, Visually-impaired, Essential services	18. Distribution Statement No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA. 22161.		
19. Security Classif. (Of this report) Unclassified	20. Security Classif.(Of this page) Unclassified	21. No. of Pages 90	22. Price N/A

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ACKNOWLEDGEMENTS

The author(s) wish to acknowledge the support of personnel from the Connecticut Department of Transportation and the Bureau of Education and Services for the Blind (BESB) for their support and guidance throughout the project period.

METRIC CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS				
SYMBOL	**WHEN YOU KNOW**	**MULTIPLY BY**	**TO FIND**	**SYMBOL**
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
^oF	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	^oC
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m^2	cd/m^2
FORCE and PRESSURE or STRESS				
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

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EXECUTIVE SUMMARY

The Americans with Disabilities Act (ADA) prohibits discrimination against individuals with disabilities in all public and private places that are open to the general public. For people who are visually-impaired, public transport plays a crucial role in productivity, community participation, and independence, especially as it is often the only feasible way to access education, work, medical care, food, and other places in the community. Past research efforts revealed that blind-low vision (BLV) individuals face additional barriers to living life as independently as possible. A major barrier to independence for the blind and visually-impaired is the fact that most information in public is relayed visually. Use of emerging technologies can help BLV individuals overcome barriers to living life independently.

In Connecticut, there are several state agencies working to find solutions that would allow visually disabled individuals to live more independently and improve their quality of life. As part of the ongoing effort by the Connecticut Department of Transportation (CTDOT) and the Department of Aging and Disability Services (ADS) to create the best navigation experiences for Connecticut, a Aira pilot program was implemented in Connecticut sponsored by the state of Connecticut aimed at providing visual assistance to individuals who are blind or have low vision to access both public transportation and essential services. Aira is one of the fastest-growing assistive technology options for BLV individuals that connects BLV users with live, personal agents who describe their surroundings for them.

The goal of this project is to implement Aira across the entire State of Connecticut, to be used for navigation, wayfinding, using public transit, and ensuring proper social distancing for BLV individuals. The Connecticut Transportation Safety Research Center (CTSRC) at the University of Connecticut (UConn) team worked with the CTDOT, Connecticut ADS- BESB, and Aira Corp. to obtain the following project objectives:

- Understand the travel patterns and barriers faced by visually-impaired individuals in Connecticut by conducting a questionnaire survey. The survey results can provide an overview of the needs and barriers faced by the BLV community while using public transportation or conducting daily activities (shopping for groceries, medicine, etc.).
- Implement promotional and free Aira pilot services across Connecticut to assist BLV individuals in Connecticut.
- Evaluate the effectiveness of the service provided by Aira in helping BLV individuals in Connecticut at the end of the promotional period through a follow-up survey.

The UConn project team conducted a preliminary survey to understand the travel patterns and barriers faced by BLV individuals in Connecticut. The questionnaire was deployed at the beginning of the project and survey responses were collected until March 2023. The UConn project team also worked with CTDOT, ADS-BESB, and Aira Corp. to implement Aira services in

Connecticut and conduct outreach activities to inform Connecticut residents who are visually-impaired about the availability of Aira services paid by the state. To evaluate the effectiveness of Aira services in Connecticut, the UConn project team collected Aira usage data from Aira and conducted a follow-up survey to collect user feedback on Aira services. The follow-up survey was deployed in March 2023 and survey responses were collected until April 2023. All survey responses and Aira usage data were analyzed by the UConn project team.

The preliminary travel behavior survey provided insight into the barriers faced by blind or visually-impaired individuals in Connecticut. The survey results indicated a series of issues experienced by visually-impaired individuals when using public transportation options. Feedback from survey respondents can also be used as future development alternatives to make the public transportation centers such as bus/train stops and transit hubs more accessible for visually-impaired individuals. Moreover, affordable assistance solutions need to be identified to assist visually-impaired individuals in completing daily activities considering the majority of the visually-impaired population are aged more than 60 years and either unemployed or retired.

The Aira pilot program was implemented in Connecticut for 18-months from September 1, 2021 to April 30, 2023. A total of 63 participants registered for the promotional Aira services. Aira usage data indicated that 4,391 calls were made to Aira by the registered users with a total call duration of 58,021 minutes. However, Aira usage data also indicated the promotional service provided by the state was extensively used by a single user, denoted as “Super User” who made 31% of all calls to Aira contributing to around 60% of total call duration. Based on the analysis results from the Aira usage data and follow-up survey results, it is evident that there was a lack of awareness among visually-impaired individuals regarding the availability of promotional visual assistance services. More user campaigns and extensive publicity were needed to inform visually-impaired individuals in advance about the availability of such services. Based on the feedback received from users, Aira agents accomplished the target task in most cases.

Based on the findings from the study, it was evident that there is a need for virtual assistance services to assist blind or visually-impaired individuals while accessing essential services. Focus group surveys should be conducted to better understand the variety of needs and requirements of visually-impaired individuals to provide more appropriate or cost-effective services that can meet the variety of needs of visually-impaired individuals. However, specific instructions should be put in place for future deployment of assistance services ensuring that no one user will be able to overuse services paid for by the State. Due to low user enrollment, Aira services were underused compared to the payment made by the State of Connecticut. A model of payment should be developed in the future to ensure that promotional services sponsored by a state agency are appropriately used.

CHAPTER 1 INTRODUCTION AND BACKGROUND

1.1 Background

Blind or visually-impaired people represent a significant portion of the total population with an estimated 32.2 million American adults, age 18 years or older, reporting vision loss [1]. In Connecticut, the Centers for Diseases Control and Prevention (CDC) reported that 4 percent of the total population in Connecticut have vision-related disabilities [2]. In Connecticut, there are several state agencies working to find solutions that would allow visually disabled individuals to live more independently and improve their quality of life. The Bureau of Education and Services for the Blind (BESB) within the Connecticut Department of Aging and Disability Services (ADS) is the state's leading bureau for the coordination and provision of services to all Connecticut residents who are legally blind or have significant visual impairments [3]. Similarly, the ADS Bureau of Rehabilitation Services (BRS) strives to create opportunities for individuals with significant disabilities to work competitively and live independently [4]. The Bureau of Public Transportation in Connecticut also aims to provide a variety of services to individuals with disabilities seeking reliable transportation [5].

Public transportation plays a critical role in communities by providing reliable and accessible modes of transportation. The Americans with Disabilities Act (ADA) prohibits discrimination against individuals with disabilities in all public and private places that are open to the general public, including the workplace, educational facilities, and public transportation [6]. People with disabilities have the same rights as those without disabilities to use public transportation modes. For people who are visually-impaired, public transport plays a crucial role in productivity, community participation, and independence, especially as it is often the only feasible way to access education, work, medical care, food, and other places in the community [7]. Therefore, it is critical to provide access to public transportation that provides a reliable travel experience to people that are blind or have low vision (BLV).

To successfully utilize public transportation services, users must gather information about their physical surroundings using the visual information available to them at a terminal or bus stop. This can include schedules, routes, instructions, etc., which are all presented visually. The prevalence of visual cues creates barriers for the visually-impaired population leading to an increase in taking the wrong bus or getting off at the wrong stop. Hence, efforts should be aimed at helping individuals who are BLV navigate these services autonomously and efficiently.

Our society changed as a direct result of the COVID-19 pandemic and the visually-impaired population faced a unique set of challenges due to these changes. BLV individuals are not inherently at greater risk to contract COVID-19 because of their visual impairment; however, they potentially expose themselves to increased infection risk due to lifestyle requirements [8]. A

sudden disruption of support systems and assistance occurred due to the COVID-19 pandemic which had serious impacts on health, mental well-being, daily living activities, socioeconomic, livelihood, and compromise their quality of life and may even endanger their lives [9].

Essentials such as shopping for groceries and household supplies are more difficult due to the COVID-19 pandemic for BLV individuals. For example, a report from the United Kingdom showed that BLV individuals who shop independently fell from 28% to 14% as a direct result of the pandemic [10]. Conducting essential services such as shopping for groceries and household supplies has become more challenging for BLV individuals during the COVID-19 pandemic. A UK report shows that those who are visually-impaired and shop independently has fallen to 14% from 28% as an effect of COVID-19 [10]. People with visual disabilities are having difficulty obtaining in-store shopping assistance because employees are busy restocking shelves and managing crowds. A report by the Royal National Institute of Blind People (RNIB) notes that two-thirds of visually-impaired individuals feel they have become less independent since the start of the national lockdown which may also have a negative impact on their mental health [11]. Other considerations for BLV individuals due to COVID-19 include [8]:

- Difficulties implementing COVID-19 hygiene measures (unable to locate or see the hand sanitizer stations that are prevalent in stores);
- Need to frequently touch things for orientation and to identify objects;
- Need to be guided by holding someone's elbow (elbows now used for sneezing and coughing); and,
- The use of public transportation as main source of transport (crowded, difficult to socially distance).

1.2 Use of Assistive Technologies

The use of technological advancements is becoming popular to assist and empower BLV individuals in living daily life. Across the world, several government and non-government agencies have investigated barriers faced by the visually-impaired population in using public transportation and other aspects of daily life. In the USA, the Assistive Technology Act was enacted to increase access to, availability of, and funding for assistive technology for all individuals with disabilities, including very young children [12]. In another example, a qualitative study was conducted in Austria to identify difficulties faced by visually and hearing-impaired people and proposed solutions and measures to help improve access to public transportation for these two specific groups [13]. Several handheld devices have been developed and implemented across countries to provide electronic orientation and dynamic information for visually-impaired people, especially in regard to public transportation services. Examples include TYFLOSET (Tyflo Technologies Set) in the Czech Republic [14], NOPPA (Navigation and Guidance System for the Blind) in Finland [15], and PAVIP (Personal Assistant for Visual Impaired People) in Switzerland [16].

In recent times, smartphones with specialized software installed have been used as a medium to send sound messages to people with visual impairments. The availability of GPS (Global Positioning System), GSM (Global System for Mobile Communications), and Bluetooth technologies within smartphones can be used for location and communication purposes [17]. Smartphone apps, such as Georgiephone, have been developed and implemented in the United Kingdom to provide the visually-impaired with local bus information through a voice interface [18]. Sáez et al. developed a system based on radio frequency (RF) communication within the framework of the MOVIDIS (Mobility for Visually Disabled People) which provides an alternative to assist people with visual disabilities with their mobility in the public transport system [7].

1.3 Research Objectives

Based on the advancements discussed in Section 1.2, it is evident that the use of emerging smartphone technologies can help BLV individuals overcome barriers to living life independently. Past research efforts revealed that BLV individuals face additional barriers to live life as independently as possible. A major barrier to independence for the blind and visually-impaired is the fact that most information in public is relayed visually. The BLV community also experiences barriers due to the COVID-19 pandemic and the restrictions in place to contain the spread of the virus. Thus, special attention needs to be given to assist and empower the BLV community to overcome barriers created due to the loss of their vision.

Based on existing literature, it is evident that the use of technology can be a primary barrier-breaker for the BLV community. Software and hardware advancements capable of supplementing the human senses have opened new and exciting opportunities for individuals with visual impairments. Agencies supporting the BLV community should take advantage of technological advancement in improving their quality of life and empowering them to live independently.

Aira is one of the fastest-growing assistive technology options for people who are blind or have low vision. Aira service is available in the USA, Canada, Australia, New Zealand, and the UK [19]. Leveraging leading-edge technology and human assistants, Aira delivers a unique service to make visual information immediately accessible at the point of need without a sighted assistant nearby. Aira is unique among assistive technologies or services for four primary reasons:

1. Aira is the only service to incorporate artificial intelligence and augmented reality into a dashboard that is then used by a distributed network of agents to provide location-specific and time-relevant information to its users.
2. Aira is the only service to conduct background checks, train, and monitor remote agents on a secure platform. Aira has delivered over 7.5 million minutes of service - the only service to achieve this scale using secure, professional paid agents.

3. Aira is the only solution deployed across multiple industries including over 50 airports, thousands of grocery stores, retail locations, and bank locations, equaling more than 80,000 locations. No other service supplies remote visual assistance to businesses and organizations.
4. Aira is the only broadly applicable service that can assist with any task at any time and is available 24 hours a day, seven days a week.

There are many assistive technology solutions such as single-purpose mobile applications that can help with specific tasks such as reading text, providing basic navigation information using available digital map information, or identifying the color or shape of objects in the field of view of the mobile camera. The combination of these apps, which are both paid and free, cannot solve the complex needs that occur in everyday life for visually-impaired people. Aira provides instant access to information for anyone, anytime, anywhere. Aira is established as the market leader as an interpreter for individuals who are visually-impaired. It is also important to note that 61% of the largest U.S. Airports have deployed Aira in the past 24 months. Thus, it would be beneficial to implement assistive technology services provided by Aira for navigation, wayfinding, using public transit, and ensuring proper social distancing for BLV individuals in Connecticut.

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1.4 Research Benefits

The potential benefits for the state of Connecticut as a result of the pilot application of Aira services can be described as follows:

- Cost savings and a reduction in individual rides provided through ADA paratransit.
- Insight on travel requirements, travel patterns, and barriers faced by BLV individuals while traveling for different purposes.

- Provide improved quality of life and assistance to the BLV community through advanced technology-based services.
- Ensure BLV individuals follow proper social distance guidelines due to COVID-19 while improving mobility.
- Understand the effectiveness of services using advanced technology through smartphones to assist BLV individuals in overcoming barriers.
- Able to review the standard and advanced suite of performance matrices in real-time for advanced technology-based services in a real-time dashboard setting.

The potential individual benefits of Aira services for the BLV community in Connecticut can be described as follows:

- Improved mobility while using the Aira app navigation assistance when using public transit.
- Informed decision-making while using various modes of public transportation by providing information regarding schedule, route, and other relevant information.
- Enhanced wayfinding while navigating through an unfamiliar environment with assistance from Aira representatives.
- Ensure proper social distancing guidelines for COVID-19 are followed by assisting and guiding BLV individuals moving through public places.
- Providing on-demand assistance from trained Aira agents to overcome barriers associated with using public transportation such as unfamiliar intersections, posted communication, unexpected delays, platform changes, construction on site, etc.
- Support a safe and independent shopping experience by providing on-demand assistance from Aira service representatives.
- Access to on-time medical services by improving digital accessibility for web-based appointments or navigating to the doctor's office and finding appropriate seating locations.

The rest of the project report is organized in the following chapters: Chapter 2 provides an overview of how Aira works and a brief discussion of activities conducted during the project period. Chapter 3 presents the data analysis and findings which includes analysis and findings from the preliminary travel behavior questionnaire survey, Aira usage data and follow-up questionnaire survey. Finally, Chapter 4 provides a summary of findings and future recommendations.

CHAPTER 2 RESEARCH APPROACH

This chapter presents the overall process for implementing the virtual visual assistance pilot program in Connecticut and the plan adopted to conduct the research study. This project consisted of a number of partners working collaboratively to evaluate how to best improve mobility and independence through the deployment of assistive technologies for BLV individuals. Aira Corp. was selected to provide visual virtual assistance for BLV individuals in Connecticut for 18 months. Additionally, Aira Corp. was responsible for modifying their software specifically for Connecticut and then deploying a pilot run of free service to BLV users which was pre-paid by the Connecticut Department of Transportation (CTDOT). BLV participants for the pilot implementation were recruited though email campaigns administered by Connecticut ADS-BESB. The promotional email to recruit participants was drafted in partnership between Aira, UConn, CTDOT, and the Connecticut ADS-BESB. The research team at UConn developed an initial questionnaire and conducted a survey to assist the team in understanding the travel patterns and barriers faced by BLV individuals in Connecticut. A promotional code was offered at the end of the initial survey to register for Aira services. A follow-up user survey was conducted at the end of the promotional period (18 months) to quantify how the "free" service provided by Aira assisted BLV individuals in navigating and successfully utilizing public transportation to access essential services. Aira also provided a real-time dashboard with qualitative and quantitative information regarding the utilization and user feedback on the service provided by Aira. The UConn project team used the Aira-provided real-time dashboards along with qualitative and quantitative data to summarize and evaluate services provided to BLV individuals in Connecticut.

2.1 Project Implementation

The project kick-off was conducted in June 2021 to implement virtual mobility assistance in Connecticut through Aira Corp. The UConn project team worked with CTDOT, CT ADS-BESB, and Aira Corp. to develop a questionnaire for initial and follow-up survey, develop Aira promotional service implementation plan, conduct outreach activities, prepare project documentation, promotional blurbs, and press releases of project information. Figure 2-1 outlines the overall research approach and the project timeline. An overview of major tasks completed throughout the project timeline is presented below:

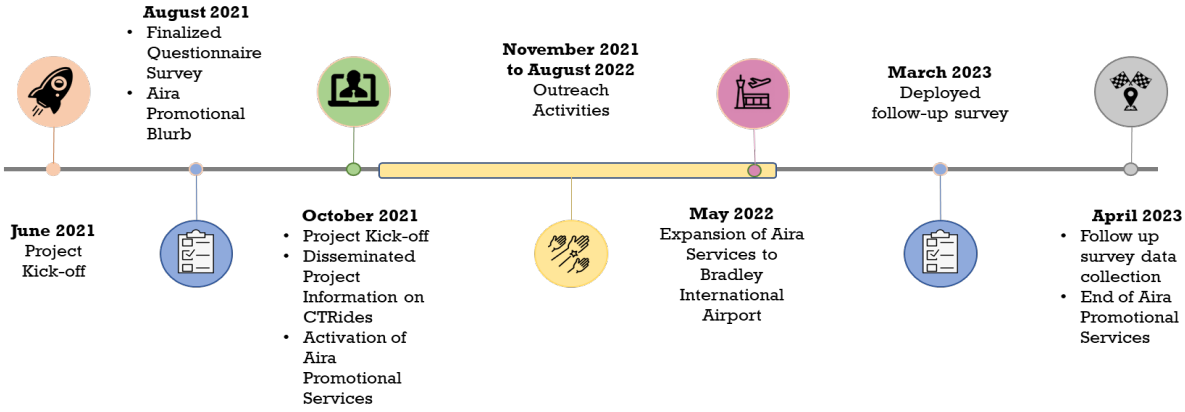

Figure 2-1 Project Implementation Timeline.

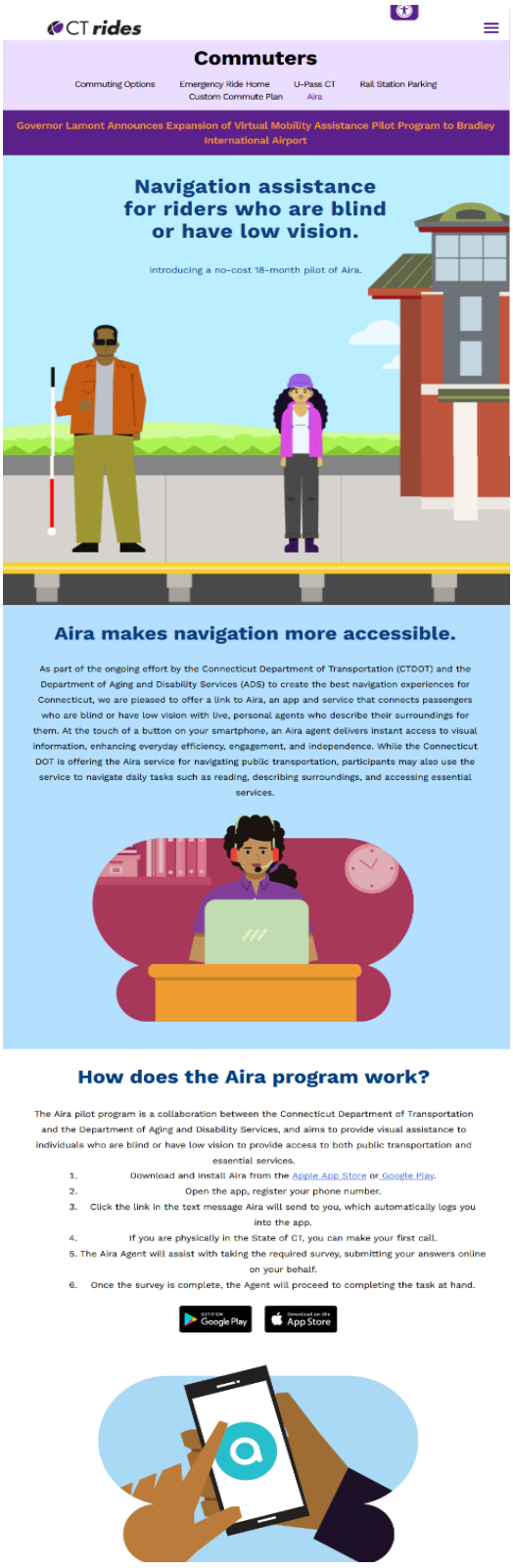

Figure 2-2 Aira Pilot Implementation Webpage on CTRides.

Project setup

- The state of Connecticut paid Aira Corp. $250,000 to provide virtual visual assistance service free of charge to blind or visually-impaired individuals in the state for 18 months.
- Based on discussion between CTDOT, CT ADS-BESB, UConn project team, and Aira, CTRides was selected to host a webpage (https://ctrides.com/aira-en/) to provide information regarding Aira's virtual mobility assistance pilot program. A screenshot of the webpage that hosted Aira pilot implementation information in Connecticut is provided in **Error! Reference source not found.**.
- A list of frequently asked questions (FAQs) was developed for the CTRides webpage in August 2021.
- The project team finalized the list of essential services covered through the promotional offer and updated the information on the CTRides webpage.
- In September 2021, the UConn project team, Aira, ADS-BESB, and CTDOT prepared a draft press release for the Aira pilot implementation in Connecticut.
- The UConn project team developed a preliminary questionnaire survey to understand travel patterns and barriers experienced by blind or visually-impaired individuals in Connecticut.
- CT ADS-BESB maintains a registry for BLV individuals in Connecticut which has approximately 5,000 members. Assuming a 10% enrollment from the ADS-BESB BLV registry to the free Aira pilot services, it was approximated that at least 500 BLV individuals would enroll for the free service provided by the Aira Corp.
- Considering at least 500 users, the promotional Aira services were valued at approximately more than $500 for each user between October 2021 to March 2023. The financial benefit information was included in the preliminary survey and promotional materials.
- CT ADS-BESB sent out an email blast to all the BESB clients to inform them about the availability of a free virtual mobility assistance program in Connecticut.

Aira Deployment

- CTDOT provided a database of the geolocations of bus and train stops in Connecticut to Aira for geofence creation in September 2021.
- Aira services were deployed in Connecticut on October 15, 2021, to assist BLV individuals with public transit.
- Aira services were extended to provide virtual visual assistance in accessing essential services.
- Governor Lamont announced the expansion of Aira's virtual mobility assistance pilot program to Bradley International Airport

Promotional Activities

- The project team prepared promotional blurb materials for conducting outreach activities.
- Agencies contacted as part of the outreach activities are as follows: **CT Airport Authority, The Kennedy Center, CTDOT - COG Coordination Unit, CTDOT - Bike & Ped Coordination (P&P), Association of Optometrists (CAO) in Connecticut, Paratransit Providers, T2 Advisory Council, CTtransit – HNS, Ctrail - SLE and HL.**
- News articles were published to advertise the availability of Aira visual assistance services for free in Connecticut. Published news articles can be found in ***TransportationToday***[1], and ***Mass Transit***[2]**.** A list of published contents is provided in Table 2-1.
- Aira was featured on Episode 26 of the ***Along the Lines*** podcast[3].
- Multiple state and local agencies were contacted to inform them about the availability of the pilot program and free access for visually-impaired individuals in Connecticut.

Project Closure

- Aria users were no longer required to complete the preliminary travel behavior survey to register in August 2022.
- A follow-up survey was deployed in March 2023 to collect user feedback from Aira users.
- The Aira promotional service ended in April 2023.

[1] https://transportationtodaynews.com/news/24252-pilot-program-assists-visually-impaired-with-public-transit/
[2]https://www.masstransitmag.com/technology/miscellaneous/press-release/21267493/connecticut-department-of-transportation-ctdot-connecticut-expands-virtual-mobility-assistance-pilot-program-to-bradley-international-airport
[3]https://portal.ct.gov/DOT/Publictrans/Bureau-of-Public-Transportation/Along-the-Lines#:~:text=Along%20the%20Lines%20Podcast&text=Host%2C%20Rich%20Andreski%2C%20the%20Bureau,your%20daily%20life%20in%20Connecticut

Table 2-1 List of Published Contents to Promote Aira Services in Connecticut.

Date	Media	Article Name	Article Location	Article Type
10/21/2021	NBC Connecticut	Aira App Helps Visually Impaired Navigate Public Transit	LINK	News Story
10/19/2021	Mass Transit	Tech service links the visually impaired with remote agents for help navigating public transportation in Connecticut	LINK	Digital Magazine Article (Repost)
10/18/2021	Transportation Today	Pilot program assists visually impaired with public transit	LINK	Digital Magazine Article
10/18/2021	Hartford Courant	Tech service links the visually impaired with remote agents for help navigating public transportation in Connecticut	LINK	Newspaper Article
10/14/2021	OTG Press Release	Governor Lamont Announces Pilot Program Offering Virtual Mobility Assistance While Using Connecticut Transit	LINK	Press Release - Office of the Governor
3/1/2022	Along the Lines	Episode 26: Aira - Making Transit More Accessible for Those Who are Blind or Have Low Vision - March 1, 2022	LINK	Podcast
Ongoing	CRIS Radio	CRIS radio promotion	LINK	Radio Advertisement
10/15/2022	DOT Comms	Promotion for Blind Americans Equality Day		Social Media Post

2.2 How Aira Works

Aira is a free-to-download mobile app that charges users per minute and is available on both Android and iOS systems. Users can connect with virtual agents who can use the caller's smartphone camera to access audio and video from users so they can see and hear the user's surroundings. The agent can utilize this data in combination with GPS and other web-based data and software, to virtually complete a task. The user workflow to use the Aira app is provided in Figure 2-3.

Virtual Aira agents are trained to provide relevant, unbiased information that allows the user to make informed decisions and complete tasks quickly and efficiently. According to Aira Corp., agents are specifically skilled in navigation and transit and are adept at efficient, accurate communication while leveraging online information such as maps, schedules, notices, and content optionally provided by the implementing agencies. A large portion of Aira's Agent training is dedicated to navigation, wayfinding, and transportation with the goal of ensuring users can travel confidently while using Aira. Agents are trained to understand the challenges and barriers typically associated with using various forms of transport (unfamiliar intersections, communication, critical social distancing information, unexpected delays, platform changes, construction on site, etc.). Aira virtual agents are available 24/7 all days of the year and meets 99.95% uptime and answering

99.5% of requests in under 10 seconds. Figure 2-4 presents the statistics of the access locations and access partners where the Aira service is available.

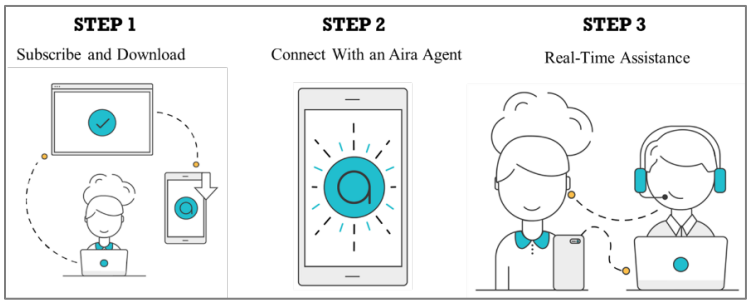

Figure 2-3 User Workflow to Use Aira Services.

Figure 2-4 Aira Access Locations and Access Partners.

Aira's deployment requires no integration with the implementing agency's physical or digital (e.g., API) infrastructure, nor does it require training of staff or users. Aira Access is offered to businesses, organizations, cities, airports, and transit authorities allowing anyone to use Aira for free in those designated locations. Key terminologies used in Aira service are described below.

- **Geofences:** This virtual geographic boundary, defined by map coordinates, enables Aira software to trigger a response when a mobile device enters or leaves a particular area based on the user's GPS location.
- **Access Offer:** A button in the Aira app that allows a user to indicate they would like to make use of the sponsored "free" Aira Service for any navigation, wayfinding, or transit-related task.
- **Push Notifications:** When an Aira traveler walks inside a geofence or is taking advantage of an Access Offer to use Aira for free, they get a push notification on their smartphone. The notification lets a user know that the service is available and reminds them that the agency (e.g., the state of Connecticut) sponsors the call for BLV travelers.
- **Software:** Users can choose to access the Aira app on their smartphone using the phone's camera to stream video to an agent.

Users can use the service in specific Aira Access locations (e.g., Target, Starbucks, Bank of America, John F Kennedy Airport, etc.) for free with the app. Users can use the service anywhere if they purchase a Aira monthly subscription. Monthly subscription members do not get charged minutes when the user is in an Aira Access location or using an agency-sponsored Access Offer.

2.2.1 Implementation of Pilot Services in Connecticut

As previously stated, Aira services were initially piloted around transit stops. To accomplish this, CTDOT provided Aira a database of the geolocations of bus and train stops in Connecticut. Aira Corp. then used the geolocations of transit stops to create geofences around these locations. The geofences automatically triggered a notification when a registered device of the user entered a geofence about the availability of free virtual assistance services from Aira. The pilot access offer was intended to be used from when a user starts a trip until the user reaches their final destination.

The purpose of implementing pilot virtual assistance services to BLV individuals in Connecticut not only included assistance with public transportation but also to enable access to essential services. Examples of essential services include grocery shopping, medical appointments, scheduling a vaccine, or confirming social distance. A complete list of essential services included in the Aira CT pilot program is provided in APPENDIX A. To assist with all listed essential services included under the pilot implementation, a geofence was later created around the entire state of Connecticut to allow for free virtual assistance services if the registered user was making a call from Connecticut. In May 2022, the promotional virtual assistance services from Aira were expanded to Bradley International Airport to assist BLV individuals who were traveling by air. To accommodate Spanish speaking individuals, Aira services were provided in both English and Spanish. Users can designate a primary and secondary language preference in the Aira profile on the app. If a user designated Spanish as their primary language preference, calls from that user were directed to a Spanish-speaking Aira Agent.

CHAPTER 3 DATA ANALYSIS AND FINDINGS

3.1 Summary of Preliminary Survey Responses

The UConn project team conducted a preliminary survey to understand the travel patterns and barriers faced by visually-impaired individuals in Connecticut. The questionnaire included questions to determine needs and barriers faced by the BLV community when utilizing transportation services. It also included questions that were designed to document travel behaviors of BLV individuals living in Connecticut. The survey questionnaire was developed by the UConn project team and comprised five main sections: level of blindness, travel behavior, travel aids, paratransit, and demographics. This approach allowed for a holistic understanding of the factors that affect mobility and the travel experience of visually-impaired individuals.

To ensure maximum participation, the questionnaire was deployed using a UConn-licensed web-based tool named Qualtrics, a widely used online survey platform. The survey questionnaire is provided in APPENDIX B. Survey links were shared with users through CTRides and Aira websites. The survey questionnaire was carefully designed and tested to ensure compatibility with screen reading software, allowing participants to navigate and respond to the questions effectively. Feedback from blind individuals was sought during the testing phase to ensure that the survey was accessible and user-friendly.

To enhance the usability of the survey, questions were concise and focused, minimizing unnecessary complexity making it easy for participants to follow and complete using screen readers. Clear instructions and prompts were provided to guide participants through each section, ensuring a smooth and efficient survey-taking experience. The questions were tailored to gather relevant information while respecting the time and effort of the visually-impaired participants. Careful consideration was given to the wording and phrasing of the questions to ensure clarity and minimize ambiguity to make it easier to understand and respond accurately.

The survey respondents were given the opportunity to benefit from a promotional offer as an incentive to participate. Responses were collected until April 1, 2023, with a total of 184 survey responses. A spreadsheet containing all questionnaire responses was exported from Qualtrics. The survey responses were then processed by removing missing responses. The questionnaire included both choice and open-ended questions. Therefore, researchers first conducted visualizations for the choice questions and subsequently summarized the responses to the open-ended questions.

3.1.1 Level of Blindness

The first section of the survey aims to understand the level of visual impairment experienced by each participant. Participants were asked to rate their level of blindness and share how long they

had experienced visual impairment. Figure 3-1 (a) illustrates that a significant proportion of the respondents identified as having either total blindness or near-total blindness, which combined over 53% of the responses. Additionally, 21% of the respondents reported severe low vision, while a smaller proportion (10%) reported no visual impairment. It should be noted that the questionnaire survey was deployed in such a way that if a survey respondent is not visually-impaired, no further responses were collected from that respondent. This was done to make sure the responses from participants without any visual impairment did not create any response bias. Thus, no further responses were collected from the 10% of respondents without any visual impairment in this questionnaire survey. This implies that a majority of the participants may require significant support and assistance to carry out everyday tasks. The findings highlight the high prevalence of total blindness among visually-impaired individuals in Connecticut.

Figure 3-1 (b) shows the distribution of responses to the question related to the duration of visual impairment among the survey respondents and indicates that nearly half of the respondents (50%) have been visually-impaired since birth. A significant proportion of respondents (25%) reported experiencing visual impairment for more than 10 years. 75% of the visually-impaired individuals in this Connecticut pilot have been living with visual impairment for at least 10 years.

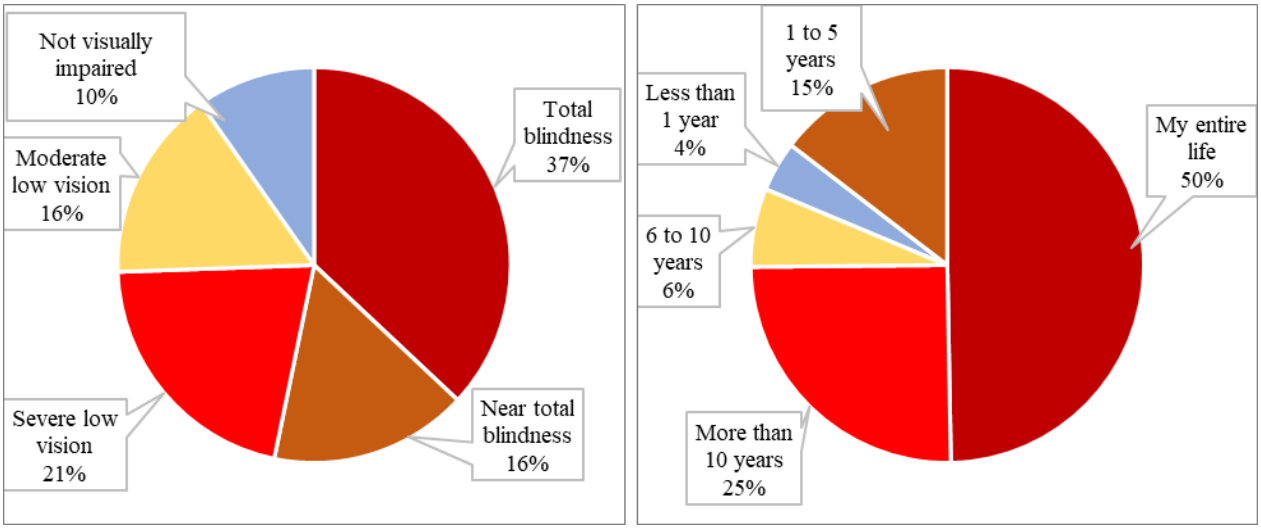

Figure 3-1 (a) What is your level of vision? (n=184) (b) How long have you been visually-impaired? (n=171)

3.1.2 Travel Behavior

The focus of this study was to evaluate the travel behavior of visually-impaired individuals. To better understand this, participants were asked how frequently they leave home and go out alone. Moreover, participants were asked to share their use of different modes of transportation and the difficulty they faced in completing specific tasks. Figure 3-2 (a) provides insights into the frequency of travel of BLV individuals in Connecticut. The responses show that 47% of the

respondents left their homes 5 to 7 days a week, indicating that they travel frequently. Additionally, 43% of the respondents left their homes a few times a week, while only 8% left their homes a few times a month. Furthermore, only 2% of the respondents reported leaving their homes once a month or less. This distribution suggests that many visually-impaired individuals rely on transportation services or friends and family for transportation. These findings confirm that a significant proportion of BLV individuals in Connecticut travel frequently, highlighting the importance of effective, efficient, and accessible transportation services.

Figure 3-2 (b) presents whether the respondent goes out alone or uses assistance from friends or family while traveling. Figure 3-2 (b) shows that while many visually-impaired individuals in Connecticut have some degree of independence in their travel with 26% reporting always going out alone and 49% reporting sometimes going out alone. There is a significant proportion (25%) of the BLV community that rarely or never go out alone. This suggests that there is a need for additional support or travel assistance for BLV individuals in certain situations, such as unfamiliar or crowded environments.

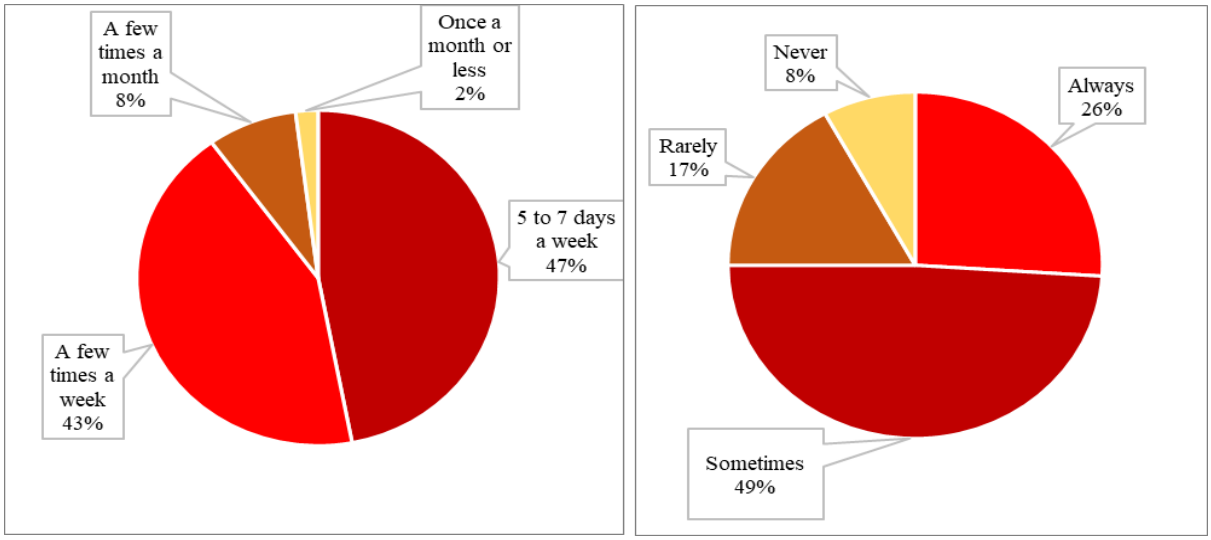

Figure 3-2 (a) How often have you left your home in the last year? (n= 162) (b) How often do you go out alone? (n= 162)

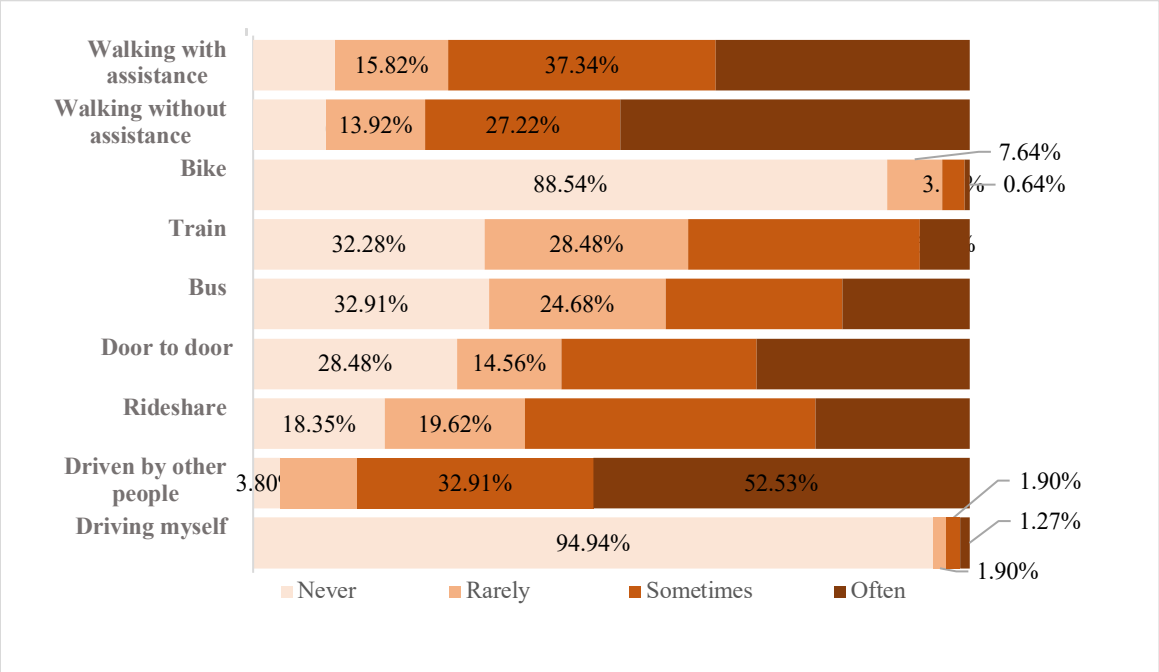

Figure 3-3 How often do you use the indicated mode of transportation? (n=158)

Figure 3-3 shows the frequency of usage of different modes of transportation among visually-impaired individuals in Connecticut. Being driven by others and walking, with or without assistance, are the most common modes of transportation for BLV individuals. In terms of walking, about half of the respondents reported often walking without assistance (48.73%) while 35.44% often walk with assistance. This suggests that the survey participants have varying levels of mobility and require different levels of assistance when walking. The responses for bus, train, rideshare and door-to-door services indicate they were less utilized than walking and being driven by others in their household. This is most likely a function of proximity to public transportation. Unless a BLV individual lives near public transit, it would be difficult to access these services.

Over half of the participants are blind, or near blind, and do not drive by themselves. According to the questionnaire responses, there seems to be a preference towards using rideshare or door-to-door services more than using buses, but this might also simply be a result of proximity to public transportation options. It is important to note that a significant portion of survey participants (33%) rarely used public transportation services. Most reported sometimes or often using rideshare (62%) followed closely by door-to-door services (57%). Only 42.4% of respondents reported using buses, and the use of trains is even lower.

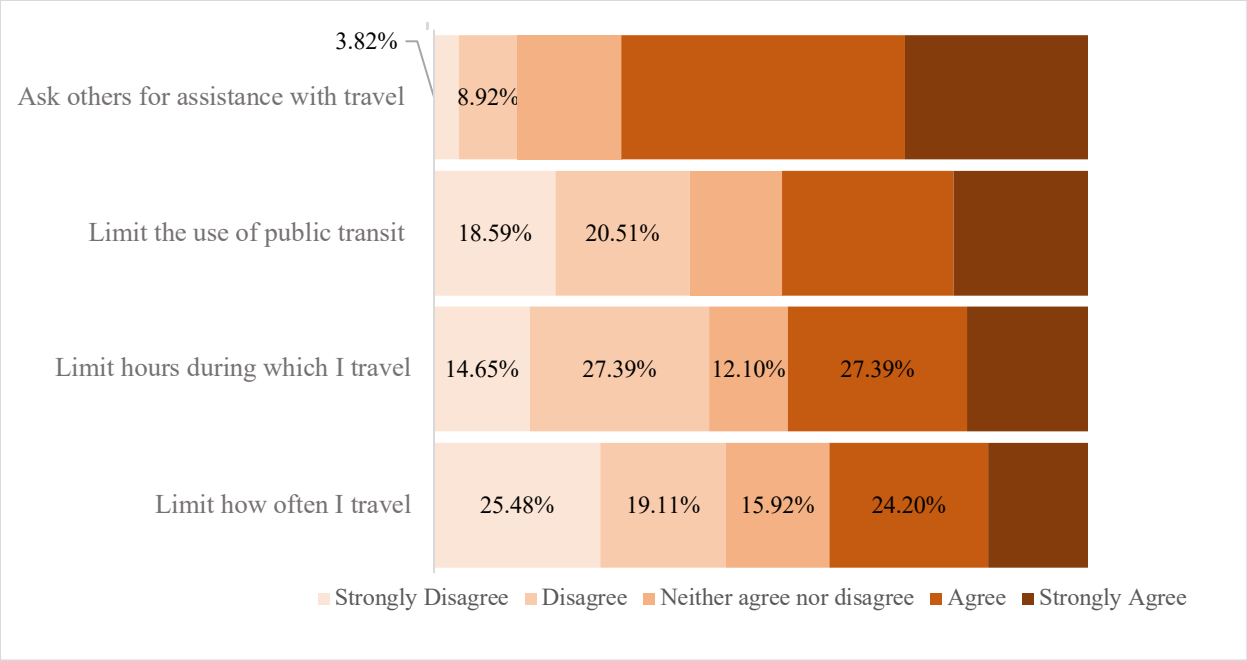

Figure 3-4 Indicate your level of agreement or disagreement with the statements considering your visual impairment (n=157)

Figure 3-4 depicts the distribution of responses to the question regarding the barriers experienced while traveling caused by visual impairment. Most participants (46.8%) either agreed, or strongly agreed, that they limit the use of public transit due to their visual impairment. In addition, a considerable proportion of participants (71.34%) agreed, or strongly agreed, that they ask others for assistance with travel. On the other hand, about 45% of the participants either disagree, or strongly disagree, with the statement that their visual impairment limits their travel. These results highlight the widespread challenges faced by visually-impaired individuals when traveling and the importance of having access to assistance with travel as well as reliable and accessible transportation options.

Figure 3-5 shows the percentage of visually-impaired individuals in Connecticut who reported experiencing difficulty completing various tasks related to mobility and orientation. The tasks with the highest percentage of participants reporting a great deal of difficulty were maneuvering train or bus stations (50%), followed by navigating parking lots (43.5%), traveling in an unfamiliar environment (43.42%), and crossing streets (32.03%). These tasks may require specific skills or assistance, such as being able to read street signs and bus numbers, following auditory cues, or having a guide. The chart also shows that participants reported more difficulty in tasks related to traveling to unfamiliar environments (43.42%) compared to tasks related to traveling in familiar environments (7.24%). These tasks may be more familiar to participants and may not require specialized skills or assistance. On the other hand, the tasks with the lowest percentage of visually-impaired individuals reporting no or little difficulty were traveling within a familiar environment

(77.63%), using stairs (76.16%), and walking along the street (58.17%). This suggests that familiarity with the environment can play a role in mobility and orientation.

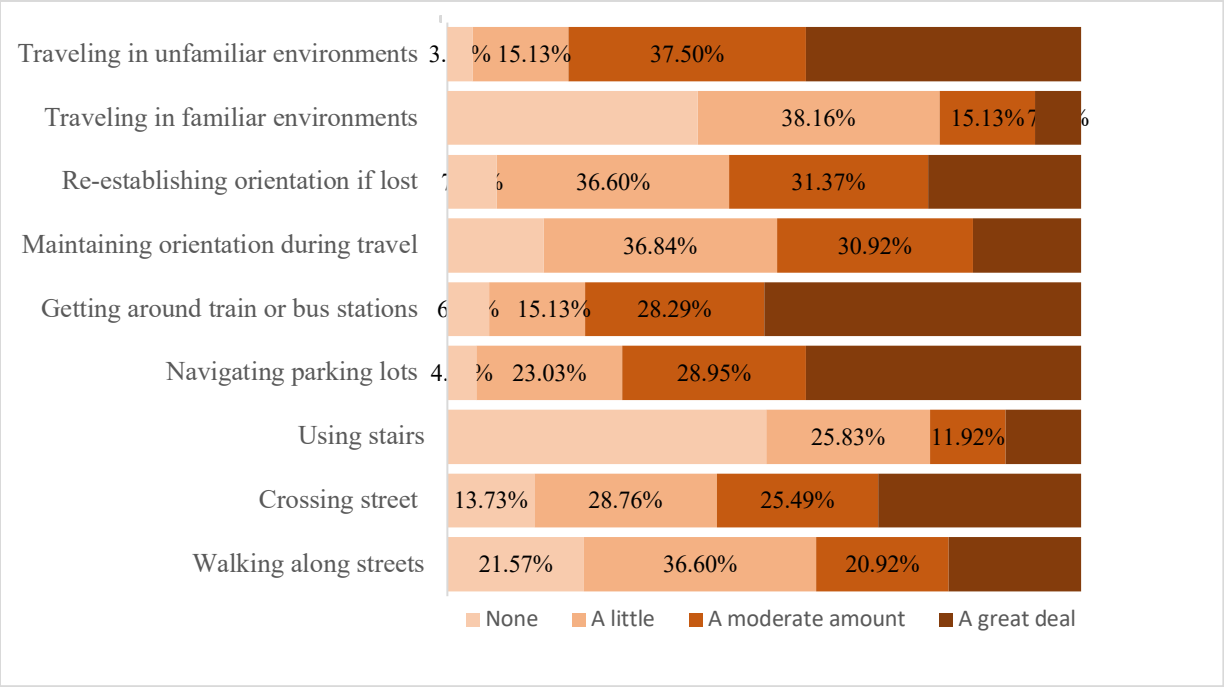

Figure 3-5 How much difficulty would you say you have in completing the following tasks? (n=153)

3.1.3 Travel Aids

This section of the survey aimed to evaluate the availability and utilization of travel aids used by visually-impaired individuals before using the Aira service. Figure 3-6 indicates that the vast majority (97%) of visually-impaired individuals have access to a smartphone, which can serve as a useful travel aid to assist visually-impaired individuals in navigating transportation systems.

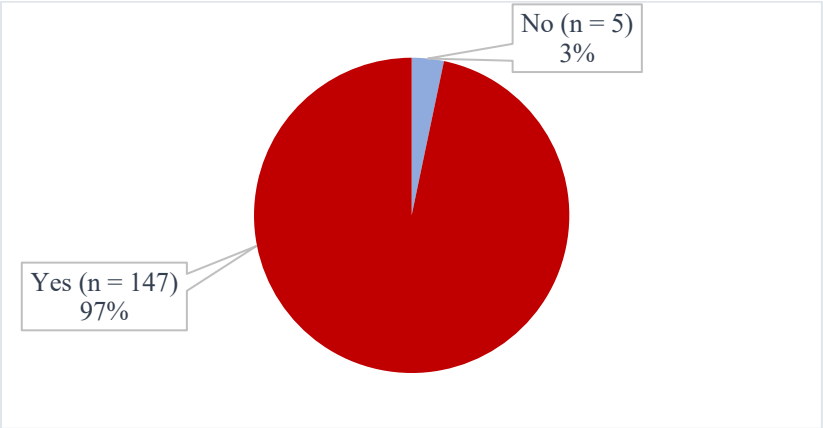

Figure 3-6 Do you have a smartphone? (n=152)

Figure 3-7 indicates that a total of 151 participants responded to the question regarding familiarity with services by Kennedy Center[4] or working with a regional mobility manager. It shows that most of the participants (86) were not aware of such services and that 37 participants who were aware of but did not use them. Only 28 participants answered yes, indicating that they have utilized these services which implies a lack of awareness about the availability of training services and regional mobility managers. This highlights the need for increased education and outreach efforts to make these resources more widely known and accessible to the visually-impaired community.

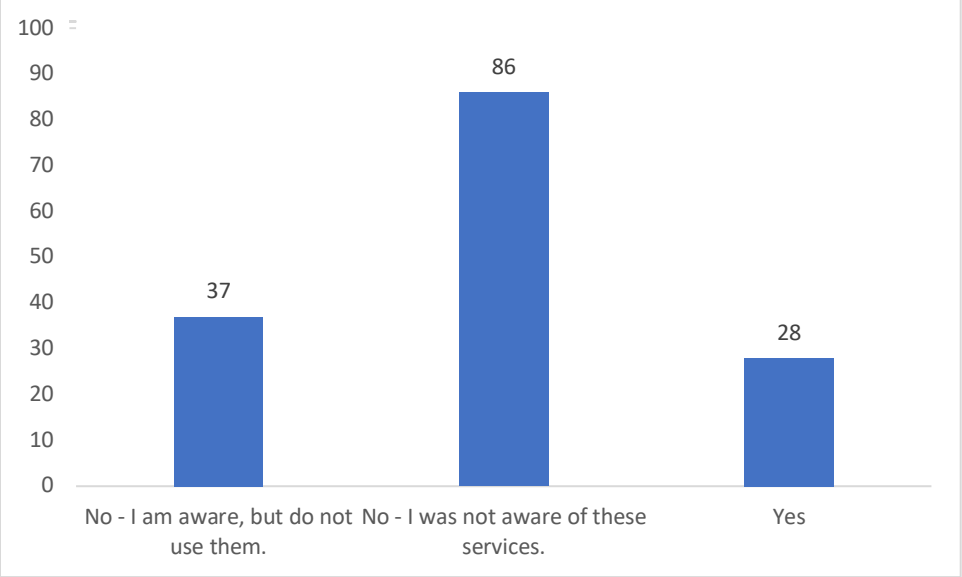

Figure 3-7 Have you worked with a regional mobility manager or taken advantage of travel training for public transportation through the Kennedy Center? (n= 151)

3.1.4 Paratransit

Participants were asked about their satisfaction level using ADA Paratransit services in Connecticut, as well as their consideration of alternative transportation options. Figure 3-8 and Figure 3-9 presents user satisfaction Connecticut ADA paratransit services and if the user would consider using public transit as an alternative to the ADA Paratransit service if a live, virtual visual assistance were provided. Below is a summary of Figure 3-8 and Figure 3-9.

- The largest group of respondents, (38 individuals or 35.8%), reported being "Somewhat satisfied" with the ADA Paratransit service. This suggests that the service is meeting some of the needs of visually-impaired individuals but there may still be room for improvement.
- Another notable group of respondents, (31 individuals or 29.2%), reported being "Neither satisfied nor dissatisfied" with the service. This could indicate a lack of strong feelings

[4]https://portal.ct.gov/OPM/Fin-General/About/Nonprofit-Grant-Program-NGP/Success-Stories/The-Kennedy-Center

about the service, or it could suggest that respondents have mixed experiences with the service.

- A smaller group of respondents (15 individuals or 15.1%) reported being "Somewhat dissatisfied" with the service, indicating that there are areas where the service could improve to better meet the needs of visually-impaired individuals.
- Only 10.4% of respondents reported being "Extremely satisfied" with the service whereas 9.4% reported being "Extremely dissatisfied". While these groups are relatively small, it's important to understand the reasons behind these strong feelings to address any issues with the paratransit service.
- About 45% of the respondents are willing to consider public transit as an alternative if live, virtual visual assistance were provided.
- About 35 % of participants may consider public transportation options as an alternative if a live, virtual assistance was provided. However, 19.6% of respondents indicated that they may not consider public transit as an alternative even if live, virtual assistance were available.

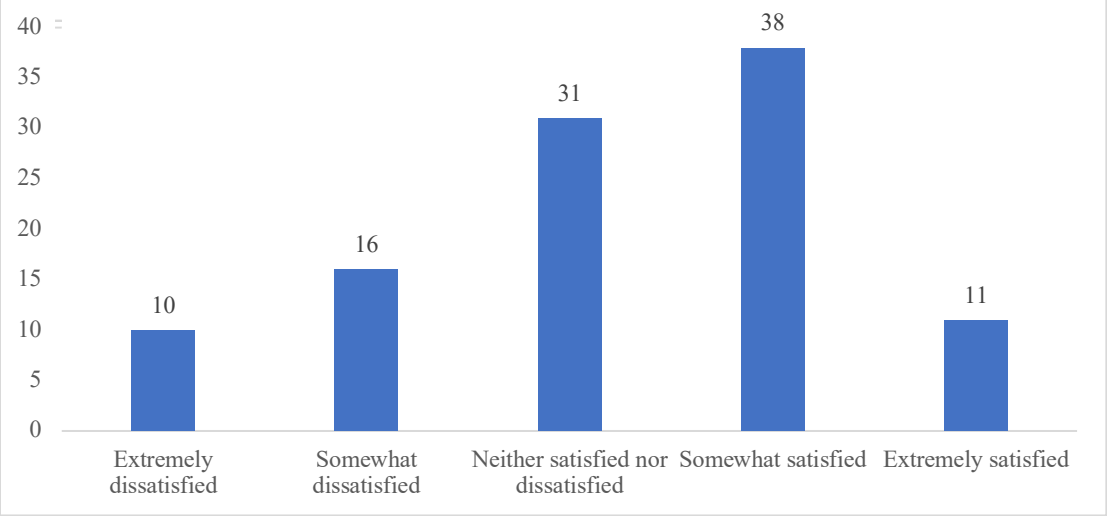

Figure 3-8 How satisfied are you with the service from Connecticut ADA Paratransit? (n= 106)

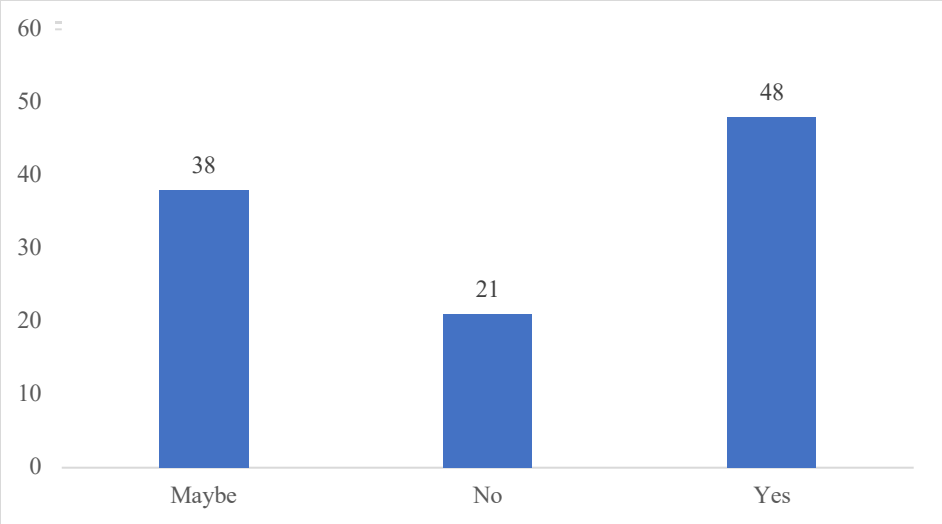

Figure 3-9 Would you consider using regular public transit service as an alternative to the ADA Paratransit service if live, virtual visual assistance was provided? (n= 107)

Overall, the survey responses suggest that the Connecticut ADA Paratransit service is meeting the needs of many visually-impaired individuals, but there is also a significant minority of respondents who are dissatisfied with the service. This may indicate that there are specific challenges or issues that visually-impaired individuals face when using Connecticut ADA Paratransit services that need to be addressed. On the other hand, providing live, virtual visual assistance may act as a catalyst that influences visually-impaired individuals to consider public transportation as an alternative to ADA Paratransit services. This survey response indicates that Aira could be beneficial, as it can provide the necessary support for visually-impaired individuals to use public transportation services more independently, which can ultimately increase their mobility and quality of life.

3.1.5 Socioeconomic and Demographics Status

Demographic information was also collected to ensure that survey participants accurately represent the BLV community. It also allows researchers to document any potential bias due to participant demographics. The section includes questions about age, race, gender, income, education, and employment status, to have a better understanding of the demographic profile of the clients. The distribution of survey responses related to responders' socioeconomic and demographic status are presented in Figure 3-10, Figure 3-11, Figure 3-12, Figure 3-13, and Figure 3-14. The summary of the responses to the socioeconomic and demographic status related questions are provided below:

- The majority of the participants who responded to the survey are over 60 years old (30%), followed by users between 51 and 60 years old (27%). Older adults might be less likely to use new and emerging technologies (26).
- Among the visually-impaired population who responded to the survey, there is a higher

proportion of females compared to males in Connecticut. It is important to consider gender differences in service design and marketing efforts to ensure that both male and female users are effectively reached and served by state sponsored programs.

- A majority of visually-impaired individuals are White (70%) in Connecticut.
- About 81% of the survey respondents indicated that they do not belong to Hispanic, Latino, or Spanish origins.
- Most survey respondents have completed some form of higher education beyond high school, with more than half having completed a 4-year college degree or higher. This implies that Aira's services may be particularly valuable for visually-impaired individuals who are pursuing higher education or career opportunities. Additionally, the relatively small number of respondents who completed 11th grade or lower may suggest that Aira's services may need to consider individuals who require more basic or fundamental services to access visual information.
- A considerable portion of the survey respondents (46 out of 143) did not provide household income information. Among the survey participants that responded to this question, the largest group (48.5%) reported an income of under $35,000. This suggests that a significant portion of visually-impaired individuals may face financial limitations, which could impact their ability to afford and access certain services or resources.
- The distribution of employment status indicates that more than half of the participants were either retired or unemployed. This may be due to the fact that a majority of the survey respondents are older adults (Figure 3-10).
- Most of the survey respondents had a household size of one or two people. This information implies that individuals who live alone or in smaller households may require more assistance with tasks such as grocery shopping and other household activities.

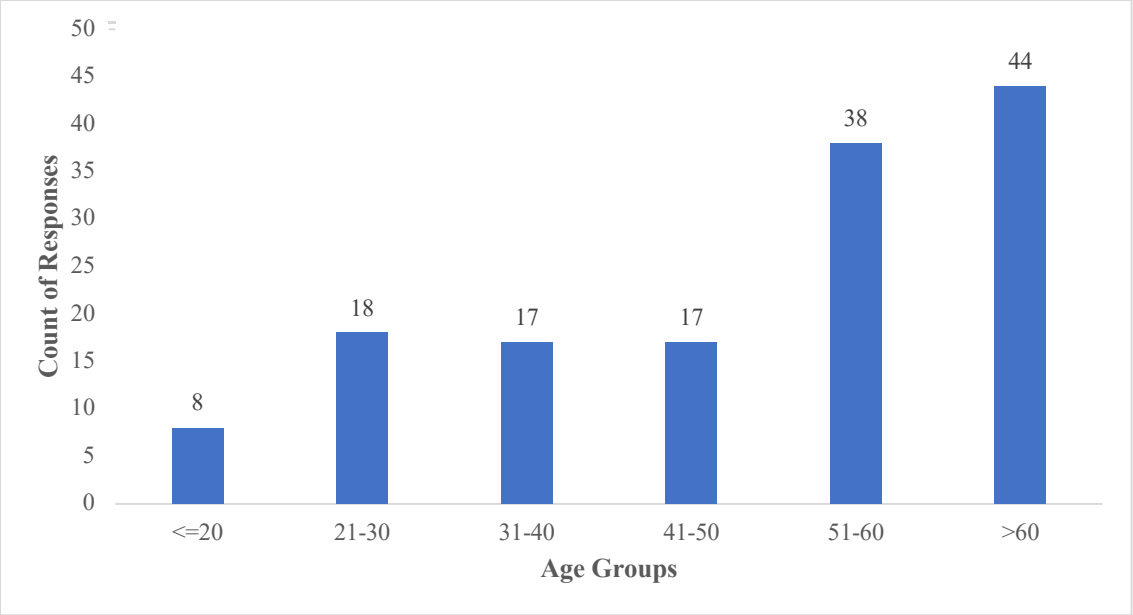

Figure 3-10 What is your age? (n=142)

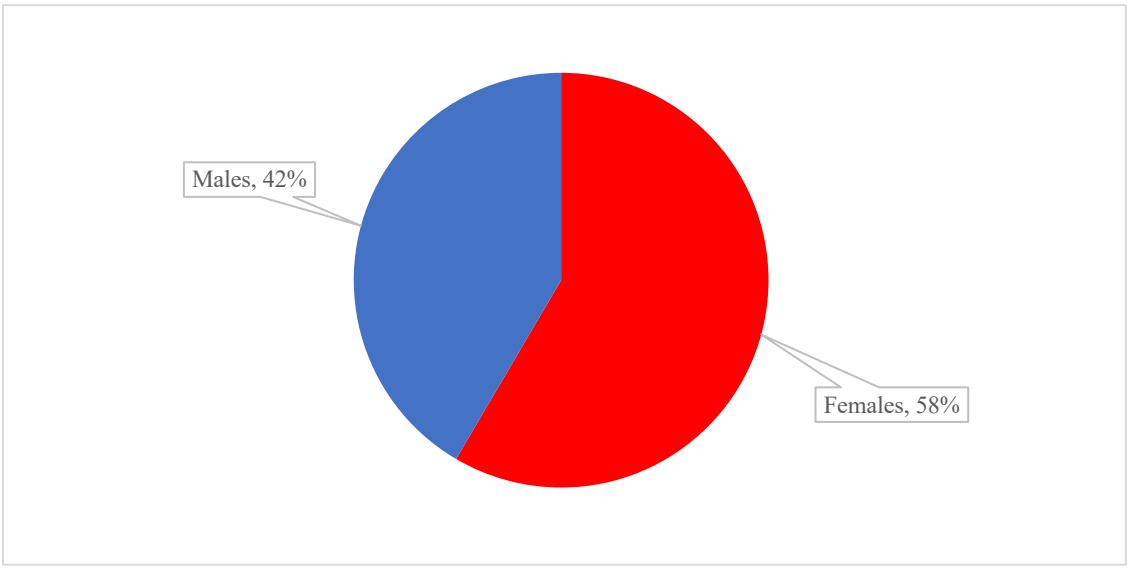

Figure 3-11 What is your gender? (n= 142)

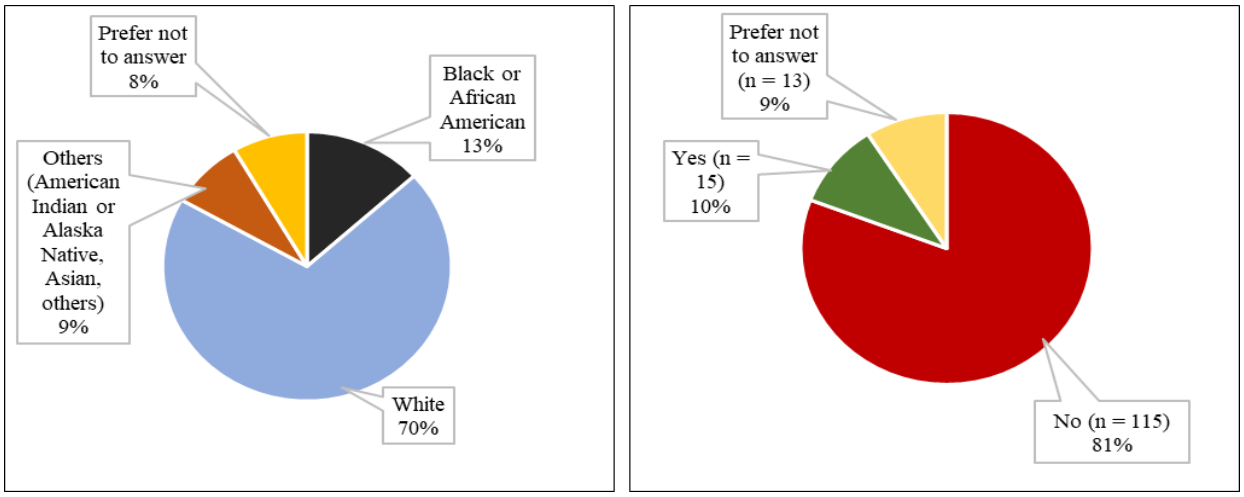

Figure 3-12 (a) What is your racial identity? (n=144); (b) Are you Hispanic, Latino, or Spanish origin? (n=145)

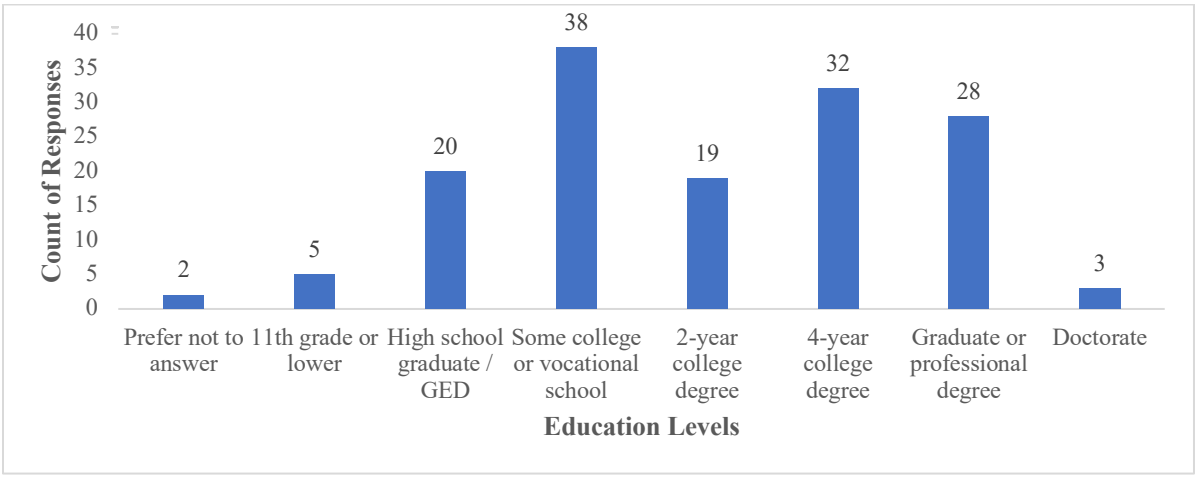

Figure 3-13 What level of education have you completed? (n=147)

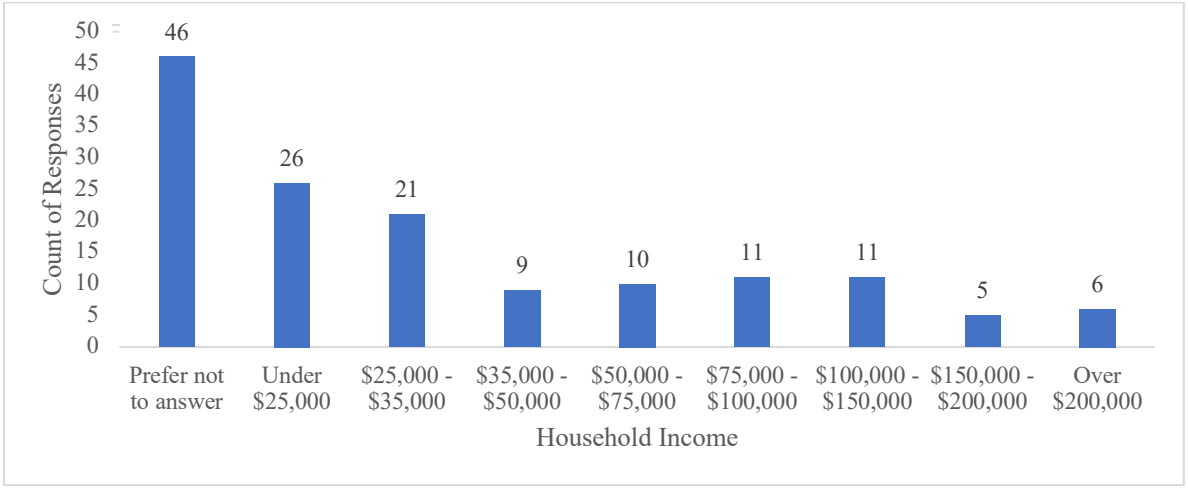

Figure 3-14 To the best of your knowledge, what is your total household income? (n= 143)

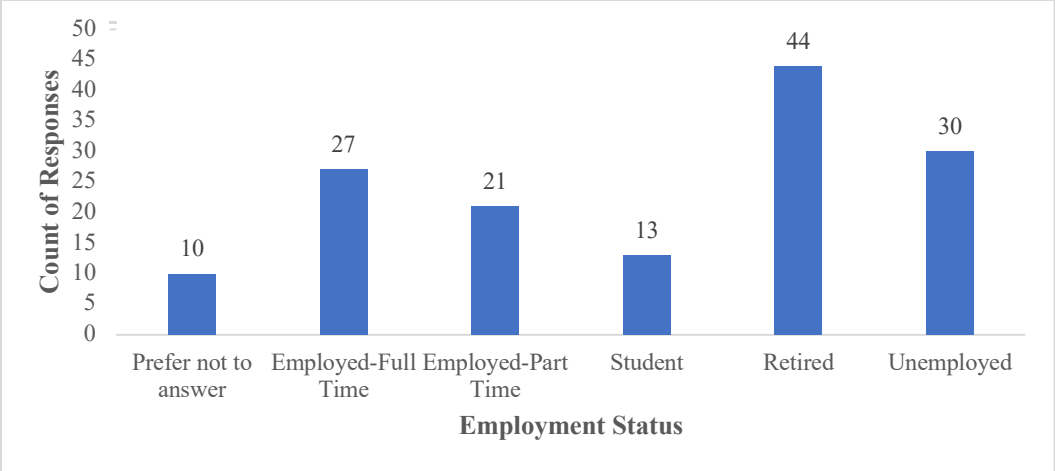

Figure 3-15 What is your current employment status? (n=145)

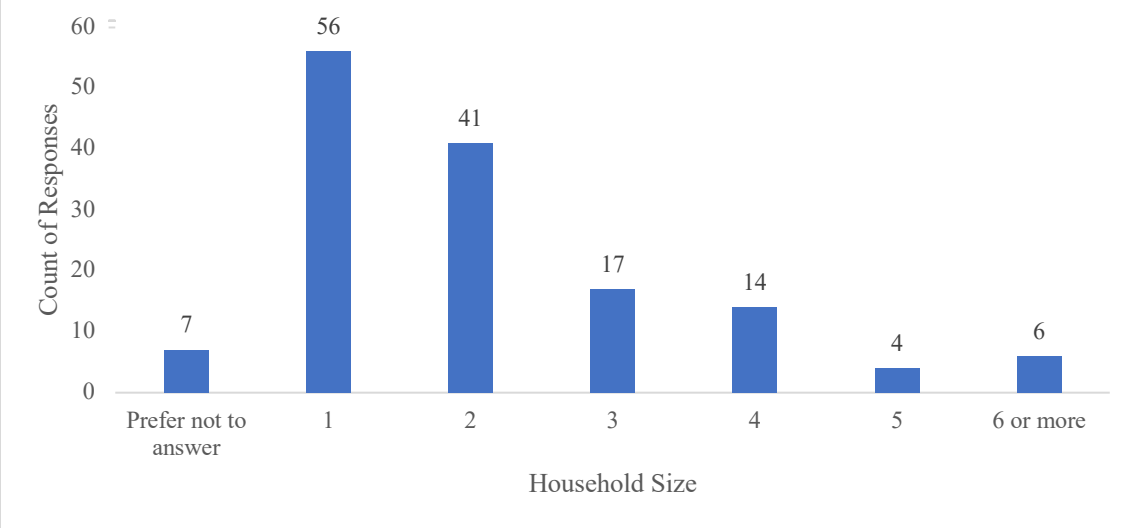

Figure 3-16 How many people are there in your household, including yourself? (n=145)

Based on responses regarding socioeconomic and demographic characteristics, it can be noted that most visually-impaired individuals in Connecticut are older adults and may have limited income and financial resources. This information could be useful while evaluating the adaptability of a paid assistance service such as Aira in terms of pricing and accessibility. Commercial visual assistance services may want to consider offering pricing plans that are more affordable for those with lower incomes or providing additional resources to help these individuals access the service. Providing affordable or discounted visual assistance services for visually-impaired individuals, who are retired, unemployed, students, or employed part-time may support these communities.

3.1.6 Responses to Open-Ended Questions

Two types of questions were asked to understand the challenges visually-impaired individuals experience while using ADA Paratransit service. First, the participants could select multiple choices and provide additional explanations for those that were not mentioned in the provided choices. The second type of question was an open-ended question. The questionnaire included six open-ended questions that were not used to generate plots. The key findings from the open-ended responses are summarized below.

Question: *What challenges have you experienced using regular public transit services?*

The most common challenges from the responses are:

- Difficulty finding bus stops or determining the correct stop;
- Inability to see or read bus numbers or street announcements;
- Unclear or confusing schedules, routes, or pricing;
- Difficulty locating the door or available seats when entering the bus;
- Challenges transferring between buses or trains, particularly at hubs or transfer points;
- Safety concerns when crossing busy roads to get to bus stops;
- Limited accessibility or orientation for those with disabilities, such as hearing or visual impairments;
- Hostility or unhelpfulness from bus drivers or other passengers;
- Challenges in navigating large bus or train stations;
- Concerns about missing stops or getting off at the wrong location; and,
- Limited or inaccurate public transportation information.

Question: *Do you have any other comments or feedback regarding your transportation options?*

Some of the most common comments were summarized as below:

- Bus stops should be marked with tactile markers, and GPS markers should be placed to notify visually-impaired people when they approach a bus stop.
- All Uber drivers should be able to speak English, and discrimination by rideshare drivers who do not accept service dogs should be addressed.
- Assistance from sighted people is necessary for navigating public transportation, and equipment that can help visually-impaired people see from far distances would be helpful.
- Fixed bus route schedules can be problematic for ADA transit services, and inter-county transportation needs improvement.
- Door-to-door services are preferred for people who have difficulty using public transportation, and there should be better transportation options for people with disabilities.
- Loud environments and crowded areas make it difficult for visually-impaired people to navigate, and some bus stops lack audible cues.

- The cost of using Uber and Lyft can be expensive, and para-transit services can be inconvenient due to scheduling.
- Limited transportation options can make it difficult to access government services and city offices.

Question: *Please list any forms of assistance (e.g. cane, guide dog, smartphone apps, etc.) you use while traveling.*

The most common forms of assistance for traveling used by visually-impaired individuals who participated in the survey are:

- White cane (16 responses);
- Guide dog (7 responses);
- Smartphone apps (7 responses, including BlindSquare, GPS apps, and Aira); and,
- Sighted assistance (6 responses).

Question: *Please list the names of any smartphone apps, services, or GPS devices you have used for assistance while traveling.*

The most common GPS and navigation apps mentioned by respondents, are as follows:

- AIRA (12 responses);
- Google Maps: (9 responses);
- BlindSquare: (8 responses);
- Be My Eyes (6 responses);
- Seeing AI: (4 responses);
- Soundscape: (4 responses);
- Apple Maps: (3 responses); and,
- Nearby Explorer: (3 responses).

Questions: *What challenges have you experienced in using the ADA Paratransit service?*

- Long wait time for transit pickup or drop-off;
- Challenging pickup or drop-off locations;
- Long hold on phone call;
- Ride does not show up after being scheduled;
- Drivers not notifying the passenger when they arrive and marking them as a no-show;
- High cost of the service;
- Difficulty reserving and modifying rides;
- Unpredictability and uncertainty of ride length and timing;
- Lack of service to certain areas or inability to use the service seven days a week; and,
- Drivers not providing adequate assistance, such as not coming to the door to help the passenger or not knowing to look out for them.

Based on the above-discussed distribution of responses to the survey questionnaire, the key takeaways are summarized below:

- A significant proportion of the survey respondents identified as having either total blindness or near-total blindness, making up over 53% of the responses, indicating that a majority of the participants may require significant support and assistance to carry out everyday tasks.
- Based on the responses to the questions in the “travel behavior” section, 47% of visually-impaired individuals in Connecticut leave their homes 5 to 7 days a week.
- While many visually-impaired individuals in the survey have some degree of independence in their travel, there is still a considerable proportion that rarely, or never, go out alone, suggesting unmet needs for additional support or assistance in certain situations.
- The tasks with the highest percentage of visually-impaired individuals reporting a great deal of difficulty were related to navigating unfamiliar environments, highlighting the need for specialized skills or assistance in these situations.
- A vast majority (97%) of visually-impaired individuals have access to a smartphone, indicating that smartphone technology could potentially serve as a valuable tool to assist visually-impaired individuals in navigating transportation systems.
- There is a lack of awareness among visually-impaired individuals regarding the availability of training services and regional mobility managers, as shown by the fact that most participants (86%) were not aware of such services and only a small percentage (18%) have utilized them.
- Most visually-impaired individuals who use the Connecticut ADA Paratransit service reported being "Somewhat satisfied" with the service, indicating that it is meeting some of their needs, but there is still room for improvement.
- About half of the respondents are willing to consider live, virtual visual assistance as an alternative to ADA Paratransit service, which could increase their independence and mobility.
- The majority of respondents are over 60 years old, suggesting a potential need for additional assistance for older adults when navigating public transportation or other spaces.
- A majority of visually-impaired individuals who responded to the survey are White and/or female. Racial and gender differences should be considered in service design and marketing efforts.
- A significant portion of visually-impaired individuals may face financial limitations, suggesting a need for affordable,or discounted services.
- Many visually-impaired individuals who responded to the survey were either retired or unemployed, suggesting a potential need for affordable or discounted services for these communities.
- Individuals who live alone or in smaller households may require more assistance with tasks and may be more willing to use Aira services.

3.2 Investigating Aira Usage

Aira service usage data of the promotional offer in Connecticut was collected from Aira to explore usage-related attributes to help determine the effectiveness of Aira services. When a user registered for the promotional Aira services, a "Hash-ID" was assigned to the user. The "Hash-ID" was used to store user-specific call-related attributes such as date of call, call duration, purpose of the call, task success (yes/no), feedback from the caller, and feedback from the agent who assisted the user on the call. The "Hash-ID" was also used to eliminate all personally identifiable information of the user. The following sections explore relevant call-related attributes that were collected from Aira.

3.2.1 Number of Unique Users

The promotional Aira service was piloted in Connecticut from October 15, 2021, to April 30, 2023. Figure 3-17 shows the distribution of the count of new users who registered for the Aira promotional services throughout the promotional period. Although 184 participants responded to the survey, only a total of 63 participants registered for the promotional Aira services. As illustrated in Figure 3-17, 11 users registered for Aira services in October 2021 which was the highest number of registered new users within the promotional period. This may be due to the extensive publicity on the availability of free promotional Aira services by CTDOT and CT BESB, via email, to BESB members, as well as an announcement from the Connecticut Governor about the promotional service. A majority of the unique users registered for the Connecticut Aira pilot in the first four months (October 2021 to January 2022) of the promotional period.

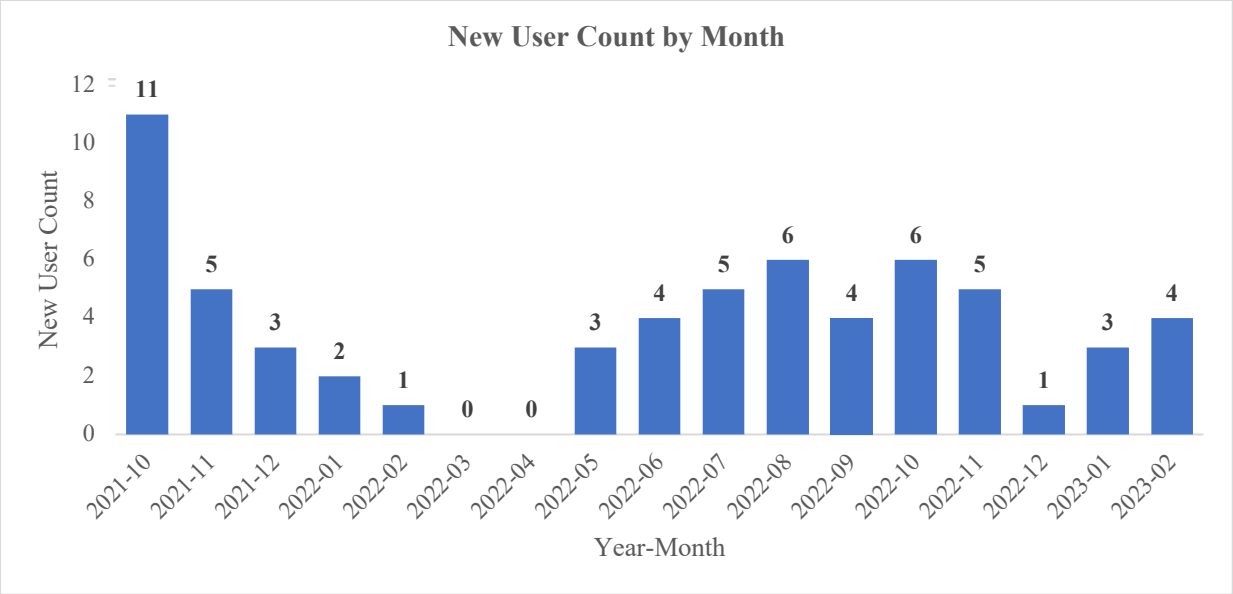

Figure 3-17 New User Count by Month.

A person can start using Aira services by registering for through Aira app. However, just because a person registered, it does not mean that they used the Aira service. To explore the number of active users, Figure 3-18 shows the comparison between the number of total users and the number of active users for each month over the promotional period. An active user is defined as someone that registered and made calls to Aira in a specific month within the promotional service period. The difference between the number of registered users and active users yields the number of registered users with no usage in a specific month. As indicated in the figure, the number of active users was almost equal to the total number of users in the first two months of the promotional period. The count of registered users with no usage increased for the rest of the promotional period. In April 2023, there were a total of 63 registered users but only 25 users made calls to Aira in that month.

Please note that the registered users with no usage presented in Figure 3-18 was calculated for each specific month over the promotional period. It is possible that a user was active/ making calls to Aira in some months but did not use Aira services in other months. For example, a user made calls to Aira in February 2022, was not using Aira services from March to July 2022 followed by making calls to Aira again in August 2022. The user in this example was an active user in the month of February and August 2022 but identified as user with no usage in March to July 2022. However, the maximum number of active users was found as 32 users in January 2023, indicating Aira never received calls from more than 32 users in any months over the 18 months period. The results also indicate that the users did not consistently use Aira services although the services were provided for free.

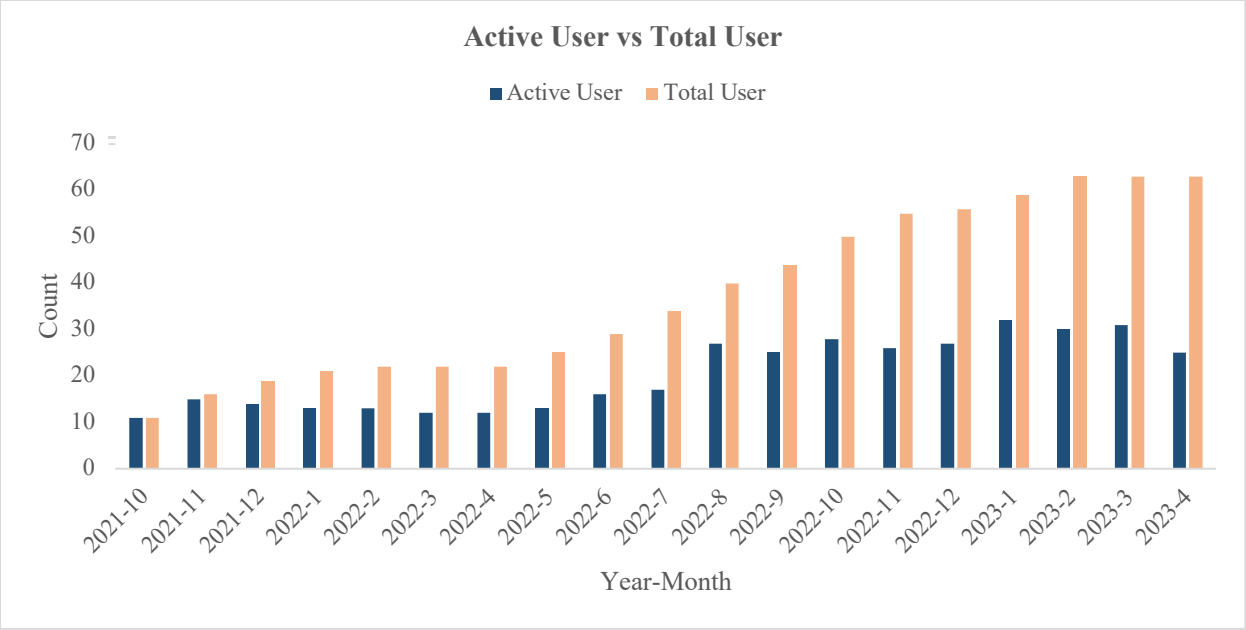

Figure 3-18 Comparison of Active Users and Total Users by Month.

3.2.2 Distribution of Calls Related Attributes

A distribution of the total number of calls made by users and their average call duration is presented in Figure 3-19 and Figure 3-20, respectively. The total number of calls made by users range from 1 to 1765. From the call count distribution, it should be noted that a majority of the users made less than 60 calls over the promotional period. However, there was one user who made 1721 calls, which was significantly higher than any other user. The next most frequent caller made only 397 calls to Aira over the promotional period. Furthermore, 50 of 63 unique Aira users made less than 65 calls over the 18-month promotional period.

Similar distribution can also be observed from the histogram of call duration presented in Figure 3-20. The highest frequency of calls lasted less than one minute. A decrease in call frequency can be observed with the increase in call duration. However, there is a significant spike in call frequency for calls lasting 29-30 minutes and more than 50 minutes. The reason for this significant spike in calls that last between 29-30 minute is not known.

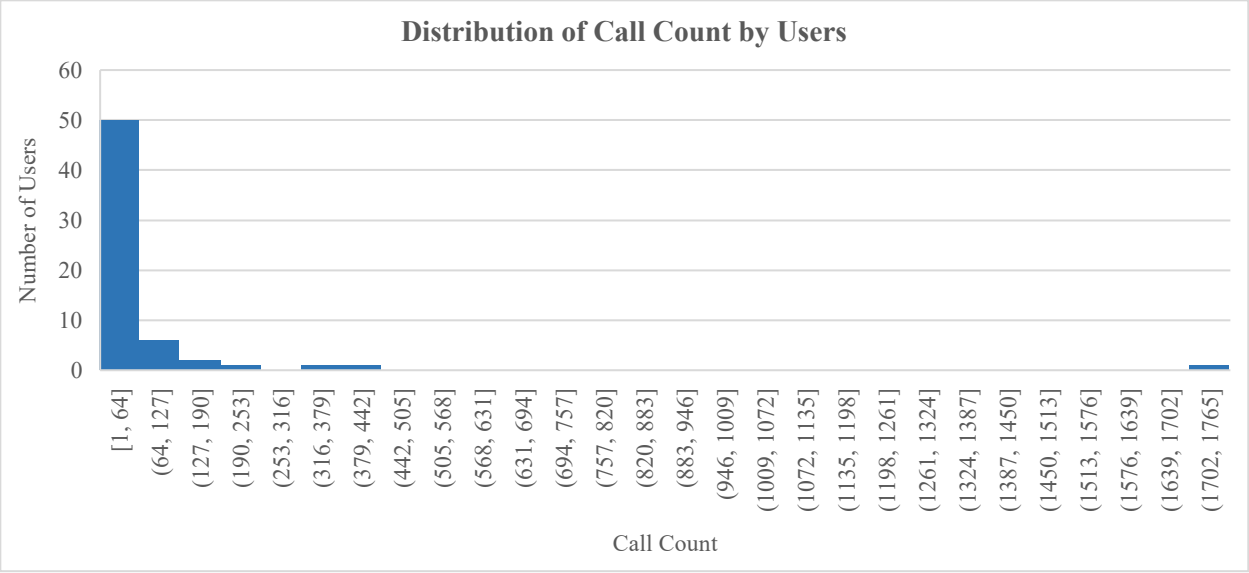

Figure 3-19 Histogram of Total Call Count.

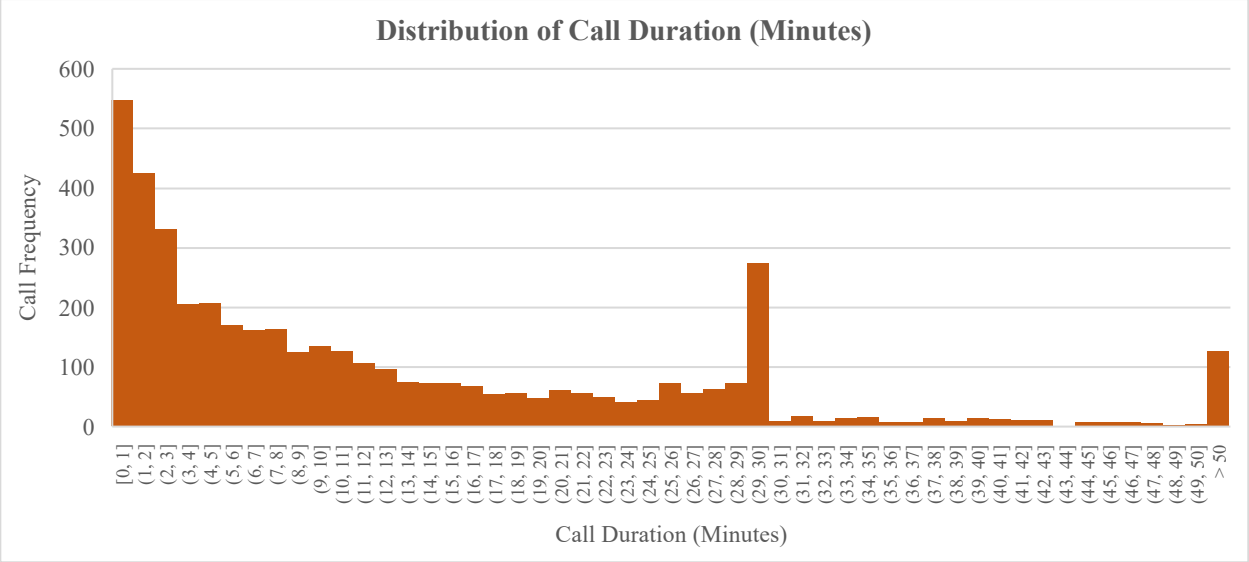

Figure 3-20 Histogram of Average Call Duration.

Considering the extensive utilization of Aira services by a single user, the usage from the user with highest usage might bias the entire database. Therefore, the distribution of total minutes of calls to Aira was categorized into a "Super User" and "Everyone Else". Figure 3-21 and Figure 3-22 illustrate the distribution of the total minutes of calls and the total number of calls by month, respectively. In both figures, the two user categories are displayed as legends to distinguish between the Super User and all the other users. In both figures, it is evident that the majority of call counts and total call duration is significantly dominated by the Super User. An in-depth review of the call records revealed that there was a total of 4,391 calls made by 63 unique users to Aira. Out of all calls, the Super User made 1,721 calls (39.1% of all calls) to Aira. The proportion of

call duration for the user with the Super User is significantly higher compared to the number of calls. The total call duration over the promotional period to Aira was 58,021 minutes for all 63 users. The total call duration for the Super User was 34,733 minutes, which was around 60% of the total call duration by all Aira users during this pilot period.

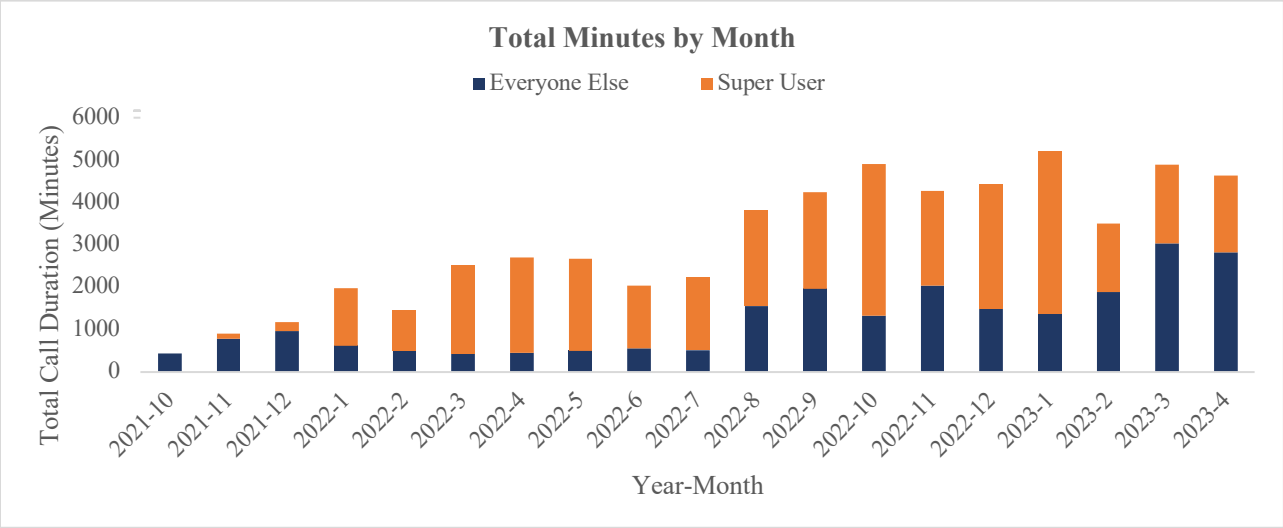

Figure 3-21 Distribution of Total Minutes for "Super User" and "Everyone Else" by Month.

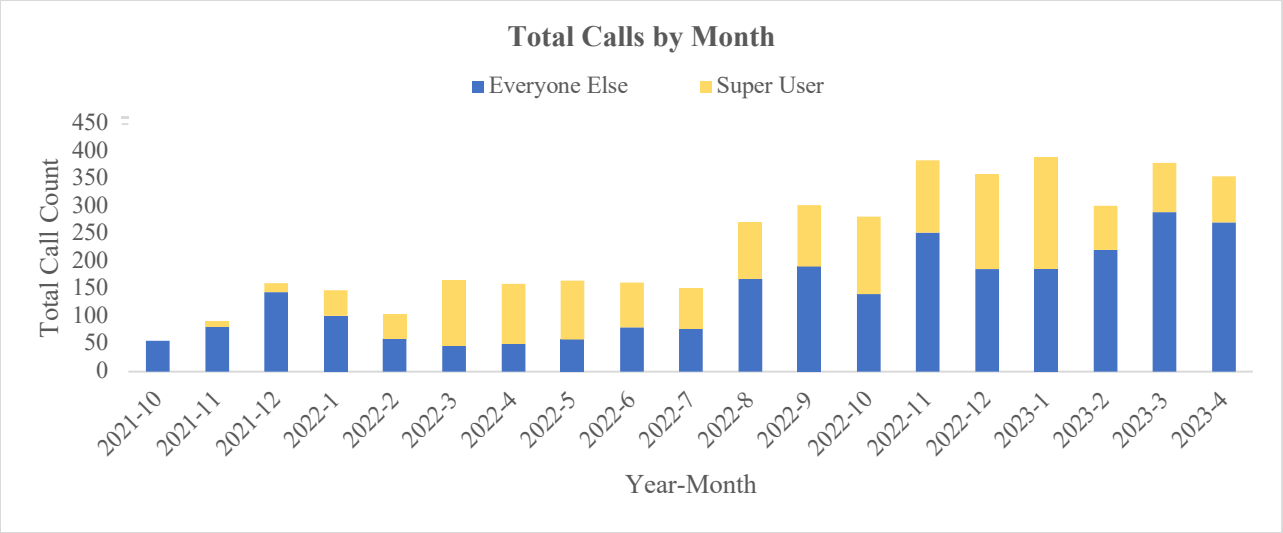

Figure 3-22 Distribution of Total Number of Calls for "Super User" and "Everyone Else" by Month.

Figure 3-23 shows a heatmap of Aria usage by zip code. This map indicates that registered users making calls to Aira were mostly located in urban cities with the majority originating from Hartford, Bridgeport, and New Haven. The figure also shows that the "Super User" is from Hamden, Connecticut. The usage heatmap also indicates that individuals from Connecticut ADS-

BESB registry living in rural areas may be unaware of the free visual assistance services provided by the State; thus, they did not register or use Aira services.

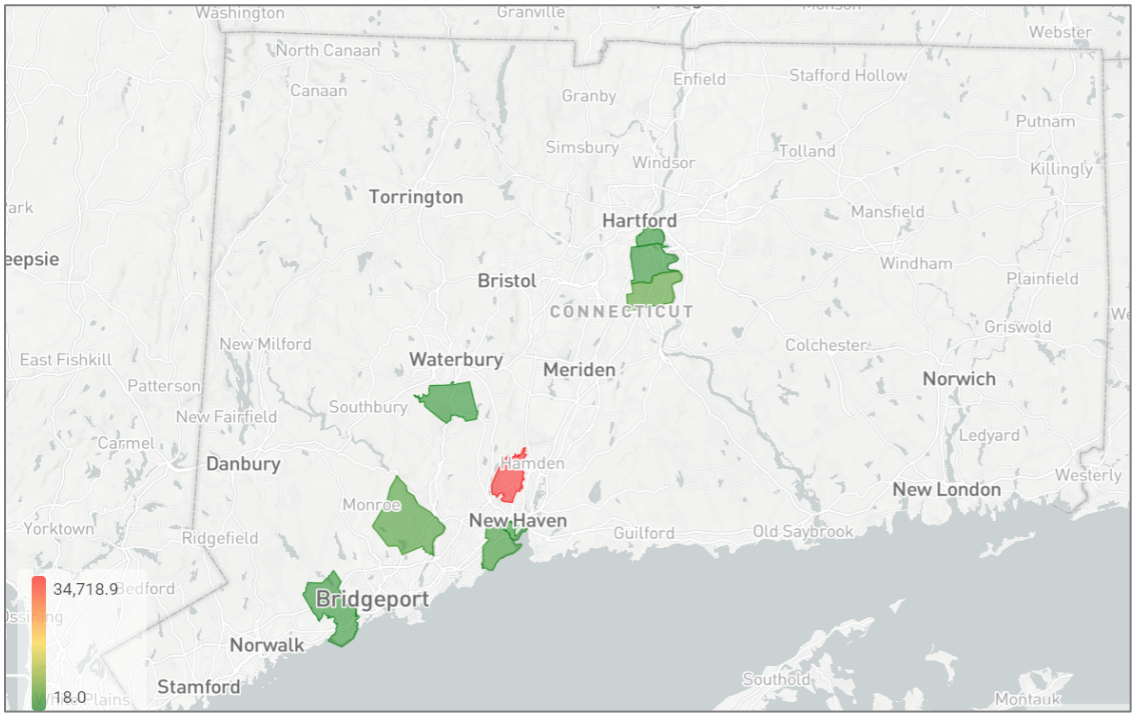

Figure 3-23 Aira Usage Heatmap by Zip Code.

To investigate the Aira usage length over the promotional period, the length of usage by each user was calculated. Actual usage length was defined as the duration (in days) between the first call and the last call made by each user. However, as the users registered for the Aira services at different times throughout the promotional period, the length of an individual's usage varies. For example, an actual length of usage of three months by a user may not indicate that they stopped using the service, but it may indicate that they joined the pilot in the last three months of the project. Thus, the actual usage length by each user is compared with the ideal length of usage which was calculated as the duration (in days) between the first call by the user and the last day of the promotional period. It was assumed that no users have stopped using Aira services, and used the services provided by Aira from the day they registered until the end date of the promotional period in an ideal condition. In such an ideal condition, the distribution of actual usage length and the ideal usage length should be identical. The goal of this comparison is to identify whether the users stopped using Aira services, or continued to use it until the end of the promotional period. Figure 3-24 presents the comparison between ideal and actual usage over the promotional period. Based on the Aira usage data, the average length of actual usage was found to be 237 days; the average length of usage in the ideal condition would have been 326 days. The results indicate that 20 users (31%) used Aira for less than 3 months (16% time of the promotional period), whereas the ideal usage length indicates that 4 users were supposed to use Aira for less than 3 months as they

registered late for the promotional service. This observation indicates that 16 users may have stopped calling Aira after using the service for less than 3 months. A similar statistic can be observed for less than 6 months of usage where actual usage length indicates that 40 users (62%) used Aira for less than 6 months (32% time) whereas the user count should have been 13 in the ideal situation. Comparing ideal and actual usage, a high number of users were expected to use Aira for more than 16 months as 19 users signed up for the Aira service in the first three months of the promotional period whereas actual usage length indicates 13 users used Aira for more than 16 months. This observation indicates that a significant portion of users may not find services provided by Aira to be useful to their needs.

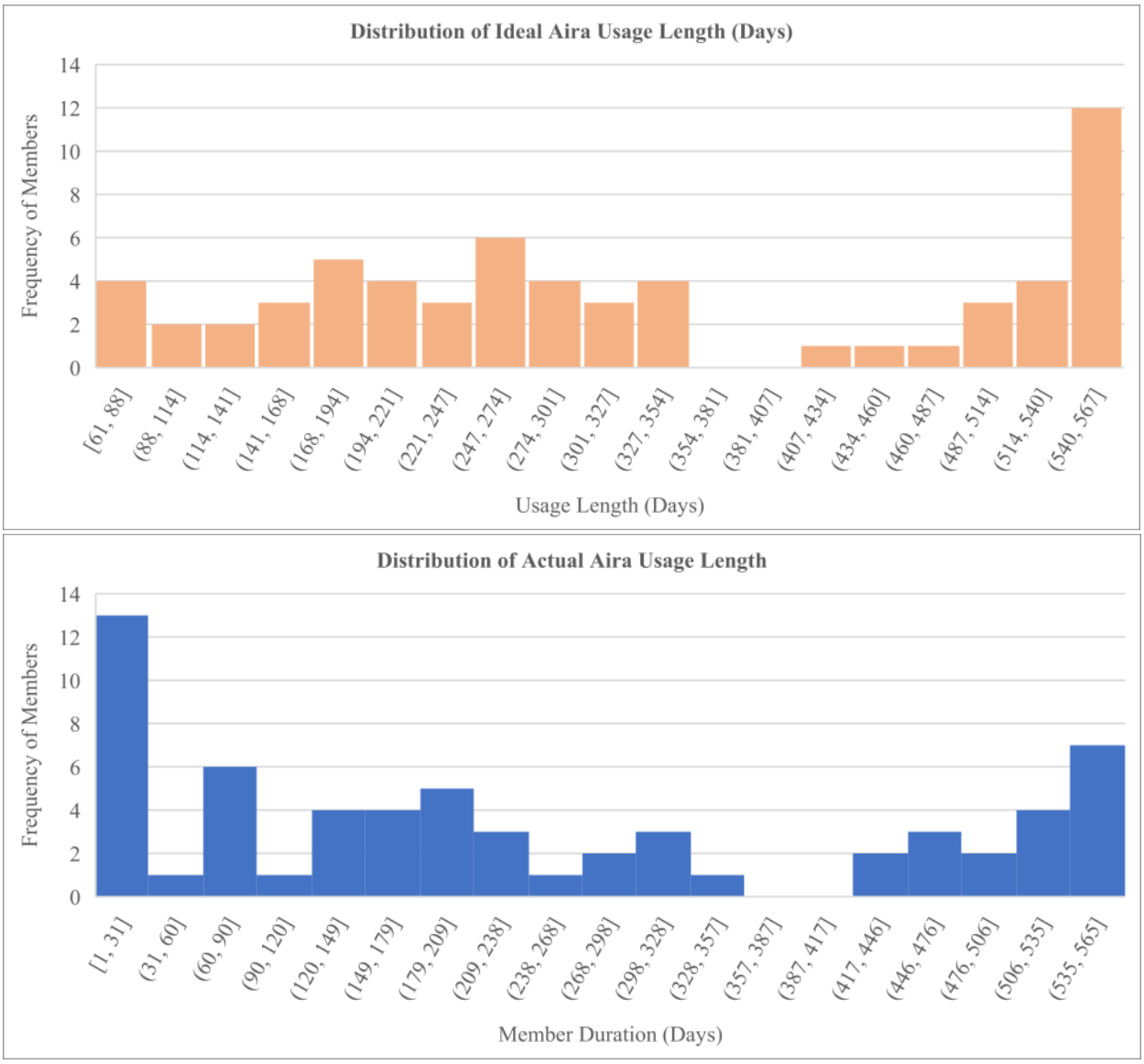

Figure 3-24 Comparison Between Ideal and Actual Aira Usage Length by Users.

3.2.3 Task Purpose and Success Rate

Aira agents tracked the purpose of each call from registered users for this study. The Aira agents who assisted the registered users during the call assigned a purpose of call to each call. The purposes of calls were broadly categorized into reading, describing, navigation, online tasks, technical assistance, and others. Figure 3-25 presents the distribution of the purpose of calls made to Aira agents. The highest proportion of calls made to Aira agents involved assistance with "Online Tasks" such as hiring Uber/ Lyft, writing emails, filling out applications, etc. The second highest proportion of calls to Aira involved "Reading" assistance such as reading messages on screens, documents, emails, etc. Users calling for "Navigation" assistance comprised 6.5% of all calls made to Aira. Examples of navigation assistance include navigating the user to get lunch, describing to the user the arrival of Uber/Lyft, navigating to pick-up and drop-off services, searching for bus stops, etc. The distribution of call purposes indicated that visually-impaired users mostly used virtual assistance services from Aira for online tasks, reading, and describing information. The Aira virtual visual assistance services were rarely used for utilizing public transportation services.

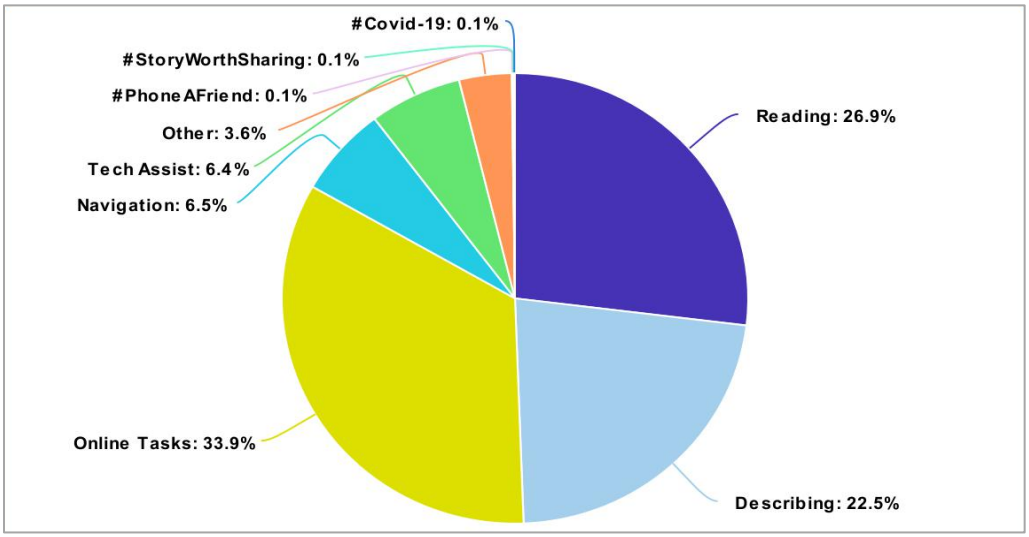

Figure 3-25 Distribution of Purpose of Calls.

In addition to tracking the purpose of a call, calls were flagged to document if the task was completed successfully. Figure 3-26 presents the distribution of task success assigned to each call made to Aira showing that Aira virtual agents were able to complete the user-desired task in 81% of all calls. When investigating calls marked as unsuccessful, the majority of calls were mostly related to call disconnection, lost call audio, or the user found someone during the call to physically assist with the task.

Users were asked to leave feedback after each call regarding their experience. Out of 4,391 calls, users left feedback in 387 calls (8.8%). Users who provided feedback mostly left positive

comments such as “Awesome! Thank you,” “Very helpful,” “Excellent,” “Phenomenal! Thank you,” etc. A few users also left negative feedback such as “Call was dropped,” “She found the wrong car,” “He could be more responsive when talking to him,” “No audio,” “Lost connection,” etc.

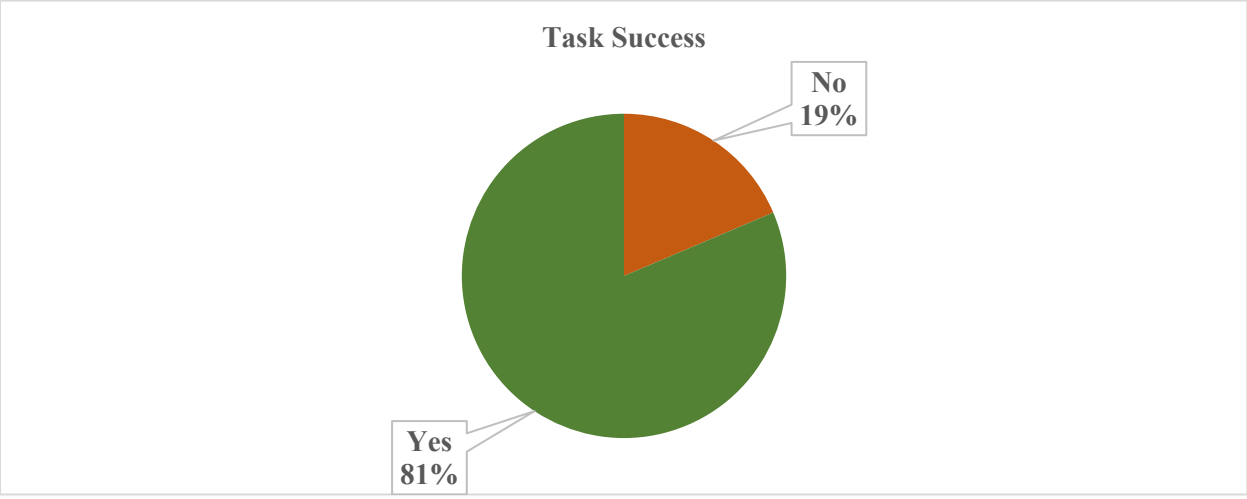

Figure 3-26 Distribution of Task Success.

The key conclusions based on the findings from call records throughout the promotional period are summarized below:

- Although 184 visually-impaired participants responded to the primary travel pattern and mobility survey, only 63 participants registered for the promotional Aira services.
- Aira was unable to attract a significant number of BLV individuals in Connecticut. The CT BESB registry has over 5,000 clients who were targeted for the Aira pilot implementation in Connecticut. Despite significant promotional and outreach activities, the enrollment in the pilot implementation was low. Other factors such as staying home due to COVID-19 may also have affected the enrollment in the promotional offer.
- Out of 63 unique users who registered for the promotional Aira services, Aira received calls from 32 users at any specific month over the promotional period.
- A comparison between registered users and active users indicated that the frequency of users with no usage per month increased after the first two months of Aira deployment in Connecticut. The pattern of increase in the number of users with no monthly usage continued to increase throughout the rest of the promotional period.
- The number of unique calls by individual users ranged between 1 and 1765. About 50 of 63 of users made less than 60 calls over the 18-month promotional period.
- About 12.5% of all calls made to Aira have a duration of less than one minute. A spike in the call duration can also be observed around 30 minutes and more than 50 minutes indicating several calls lasted 30 minutes or more than 50 minutes.
- Out of 4,391 calls made by 62 active Aira users, the Super User made 1,765 calls (39.1%

of all calls) to Aira. The Super User was also responsible for 34,733 minutes out of 58,021 minutes (60%) of total calls over the promotional period.

- The remaining users accounted for roughly 40% of the total call minutes over the promotional period.
- 33% of all calls made to Aira agents involved assistance with "Online Tasks" such as hiring Uber/ Lyft, drafting emails, filling out applications, etc.
- The Aira virtual visual assistance services were rarely used for public transportation services. However, this statement may not be completely accurate as Aira agents describing bus/ train schedules may have categorized by the Aira agents as "Reading" or "Online Tasks" instead of "Transportation/Navigation" services.
- Aira virtual agents were able to successfully assist users on 81% of all calls. Calls that were flagged as unsuccessful noted call disconnection, lost call audio, or the user found someone during the call to physically assist with the task as the reason.
- The users only left feedback in 8.8% of all calls. However, positive user feedback contained comments such as "Awesome! Thank you," "Very helpful," "Excellent," "Phenomenal! Thank you," etc.
- Users who left negative feedback commented primarily on technology issues and challenges such as "Call was dropped," "No audio," "Lost connection," etc. There were also comments on the performance of Aira agent including "She found the wrong car" and "He could be more responsive when talking to me".

3.3 Summary of Follow-up Survey

During the last month of the 18-month visual assistance pilot, the UConn project team conducted a follow-up survey to understand the effectiveness of Aira services among visually-impaired Aira users in Connecticut. The questionnaire included questions regarding the purpose of using Aira's live virtual and visual assistance, user acceptance of the Aira app, the effectiveness of the services received, and issues experienced while using Aira services. Please note that the follow-up survey was prepared and hosted by the UConn project team and administered only to Aira users already registered for this promotional service pilot. The questionnaire was reviewed and tested by CTDOT, CT BESB, and Aira before being deployed. The Aira team was responsible for advertising the survey to participants in the pilot program. Live Aira agents were instructed to assist users in completing the follow-up survey. The follow-up survey was published using the UConn-licensed Qualtrics survey platform on April 1, 2023, and survey responses were collected until April 30, 2023. A total of 45 respondents out of the 63 unique Aira users took the follow-up survey. The follow-up survey questionnaire is provided in APPENDIX B. An exploration of the survey responses is provided below.

The first section of the follow-up survey asked about the users' level of visual impairment. Since both the preliminary and the follow-up surveys were anonymous, participants were asked to

respond about their level of blindness and how long each participant has been visually-impaired. Figure 3-27 (a) presents the distribution of the severity of vision impairment and the duration of vision impairment among Aira users participating in Connecticut pilot project. The figure indicates a considerable proportion of the respondents identified are either totally blind or nearly-totally blind, which when combined, account for over 72% of the responses. Additionally, 22% of the respondents reported severe low vision, while a smaller proportion (6%) reported no visual impairment. This implies that the majority of users participating in this pilot had significant visual impairment and used Aira services for support and assistance to carry out everyday tasks. Figure 3-27 (b) also indicates that about 62% of the respondents have been visually-impaired since birth. A sizable proportion of respondents (29%) reported having visual impairment for more than 10 years. The level of visual impairment found in the follow-up survey indicated higher severity of visual impairment compared to the preliminary survey responses collected at the beginning of this project. This indicates that individuals with lower severity of visual impairment may not have found the Aira services as effective, or necessary, for their desired tasks and, therefore, did not use Aira services through the end of the promotional period.

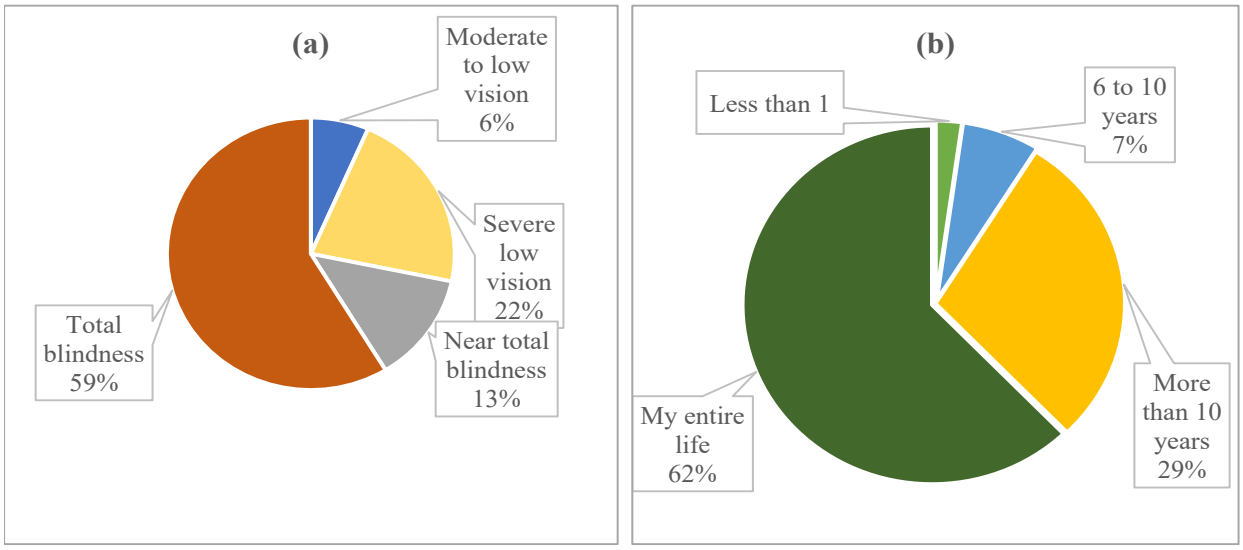

Figure 3-27 (a) What is your level of vision?; (b) How long have you been visually-impaired? (n=45)

As Aira's visual interpreting services can only be accessed using the Aira App on a smartphone, the next group of questions focused on understanding the Aira users' experiences with assistive devices/technologies and familiarity with smartphones. Figure 3-28 presents the distribution of assistive devices used by Aira users. About 93% of the respondents used a cane, and 86% used assistive applications on smartphones other than Aira. The percentage of users who use assistive apps other than Aira indicates that they were already familiar with assistive services. Figure 3-29 presents the distribution of responses where the respondent was asked to rate their level of comfort in using a smartphone/tablet on a scale from 0-10, with 10 being very comfortable. Survey responses indicated that more than 36% of Aira users are very comfortable using smartphones and

77% are comfortable using smartphone. Survey responses also indicate that about 33% of the Aira users were not comfortable using smartphones, and rated their level of comfort equal to, or below, 5 out of 10.

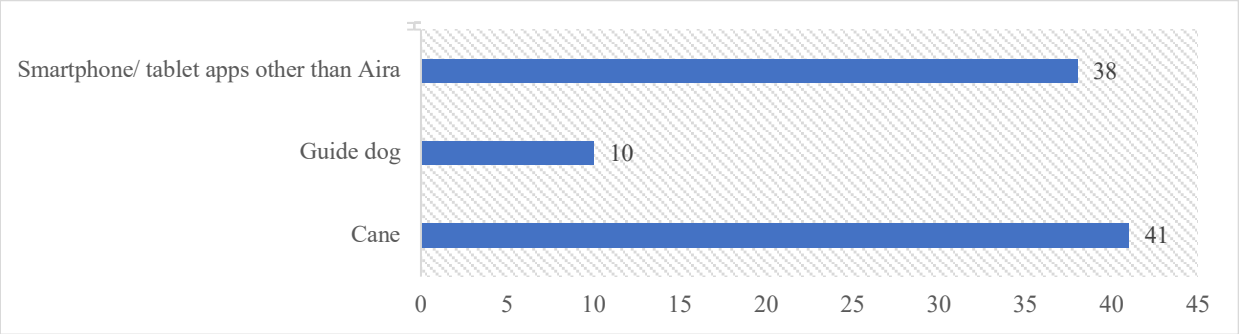

Figure 3-28 What assistive devices do you use? (n=44)

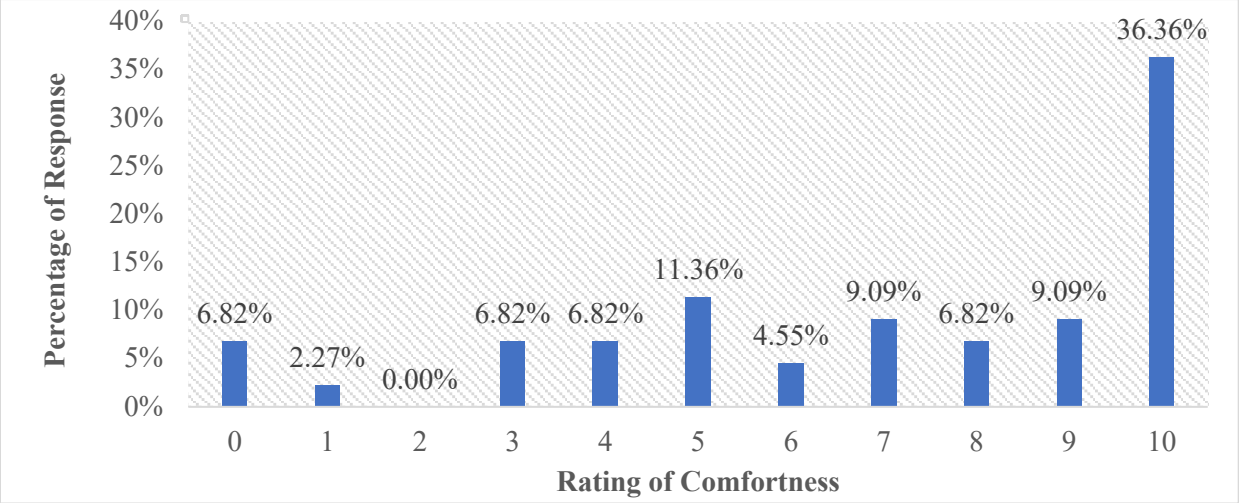

Figure 3-29 Please rate how comfortable are you in using a smartphone/ tablet on a scale from 0-10, ten being very comfortable. (n=44)

The next set of questions focused on understanding how users learned about the promotional Aira services, the main purpose of the user to use assistance from Aira, and how user-friendly users found the Aira app. Figure 3-30 shows the proportion of media channels from which Aira users learned about the promotional Aira services. Although the availability of the promotional services was advertised through the CTRides website, CTDOT, and BESB, more than 53% of the current users learned about Aira services from their friends. There was also an option to choose "Other" as a response of the question which allowed an open-ended response. This "Other" response indicated that the majority of those responding "Other" learned about Aira services from the National Federation of the Blind (NFB) conference. NFB is an organization of Americans who are blind and visually impaired and provides advocacy, education, research, technology, and programs encouraging independence and self-confidence. NFB hosts state convention in Connecticut every year which is the largest gathering of BLV individuals in the state.

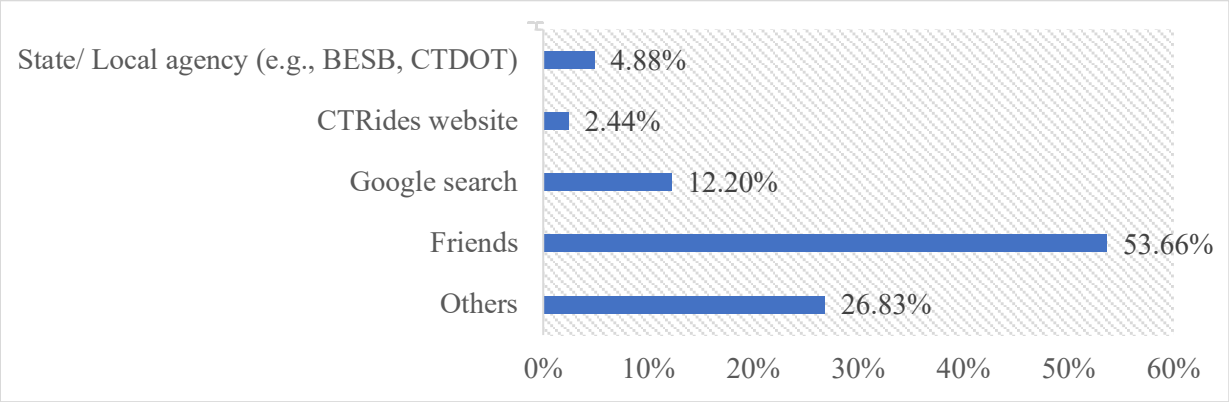

Figure 3-30 How did you learn about Aira? (n=41)

Figure 3-31 presents the distribution of the main reason Aira users requested visual assistance from Aira agents. The distribution of survey responses indicate that 24.6% users used Aira's virtual visual assistance for transportation/ navigation. This finding is contradictory compared to task purposes found in Aira call records presented in Section 3.2.3, where only 6% of calls were for navigation assistance. However, a significant number of users also used Aira services for reading documents and online tasks. The "Other" category in
Figure 3-31 includes finding household/medical items, finding lost items, labeling items, etc.

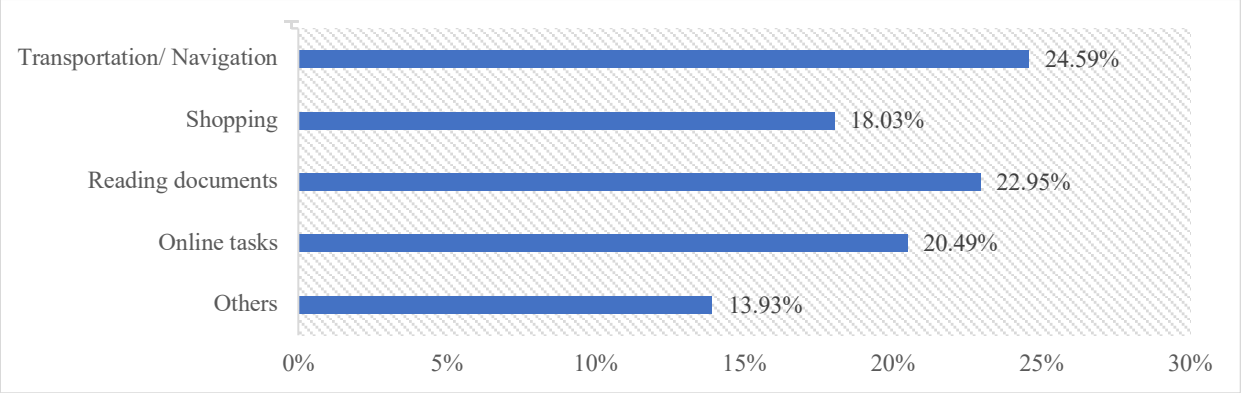

Figure 3-31 What is your main purpose for using Aira services? (n=37)

Survey respondents were asked questions focusing on evaluating the effectiveness of Aira services in assisting users in using public transportation options. Figure 3-32 presents the distribution of survey responses about the frequency of travel, as well as how often the respondent travels alone. The distribution of responses indicated that 40% of the respondents travel almost daily with around 29% indicating that they often go out alone. Figure 3-33 presents the distribution of public transportation travel modes used by Aira users while traveling. Additionally, it shows how helpful the Aira visual assistance services were in assisting respondents while using public transportation

modes. The survey responses indicated that approximately one-third of the respondents used buses and trains as travel modes. About 67% of the survey respondents indicated that the Aira service was helpful when using public transportation, while 27% of the survey respondents indicated that they did not use Aira service for using public transportation at all.

The survey respondents were also asked whether they would opt to use public transportation more with the availability of Aira's virtual visual assistance. The distribution of survey responses presented in Figure 3-34 show that about 63% of the respondents may use public transportation more with Aira services, which is remarkably similar to the percentage of respondents who had positive feedback about using Aira services for travel (67%). Around 21% of the respondents responded "Maybe" to whether they would use public transit more with Aira, and 16% indicated that they would not use public transportation more with Aira services.

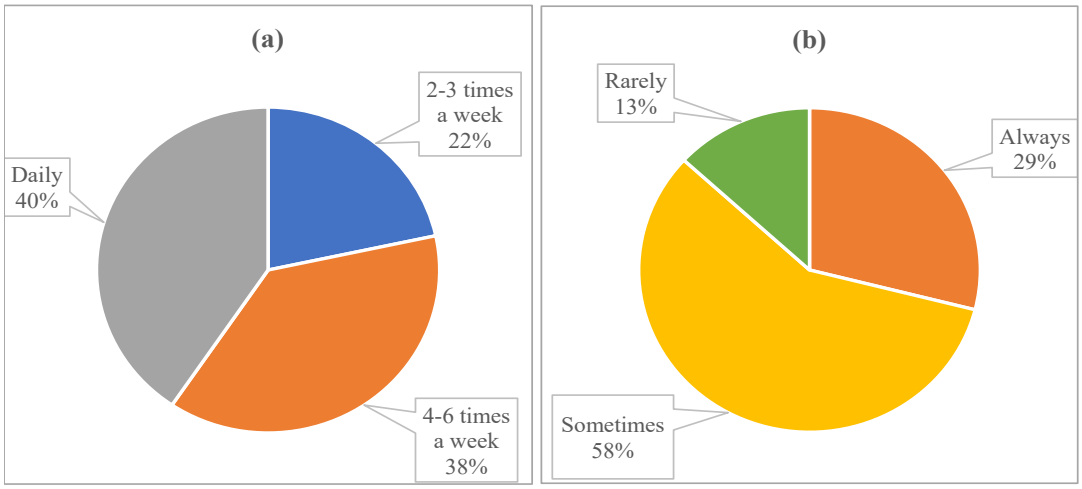

Figure 3-32 (a) How often do you typically leave home?; (b) How often do you go out alone? (n=38)

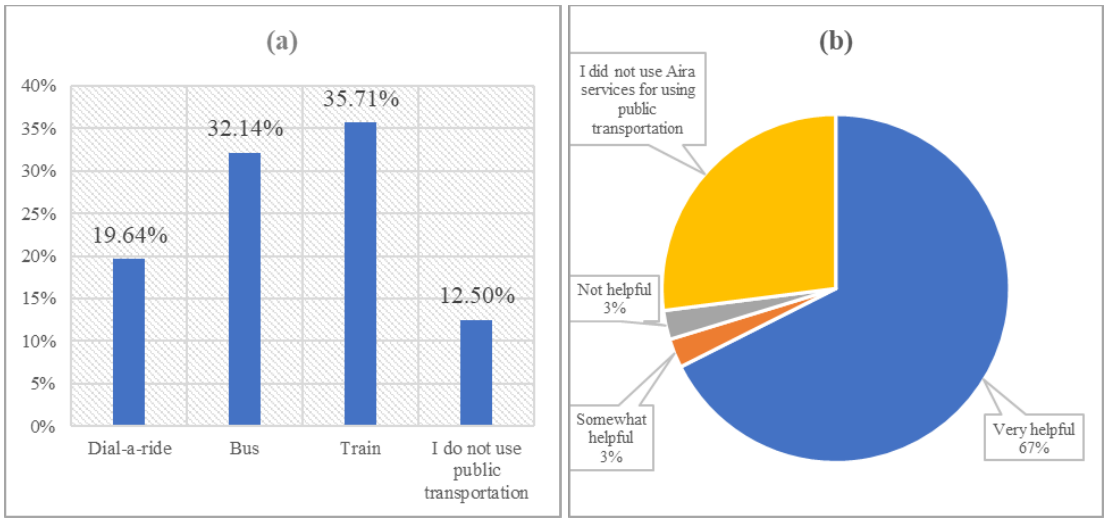

Figure 3-33 (a) Please select all forms of public transportation services you use in Connecticut; (b) How helpful was the Aira service in assisting you in using public transportation? (n=38)

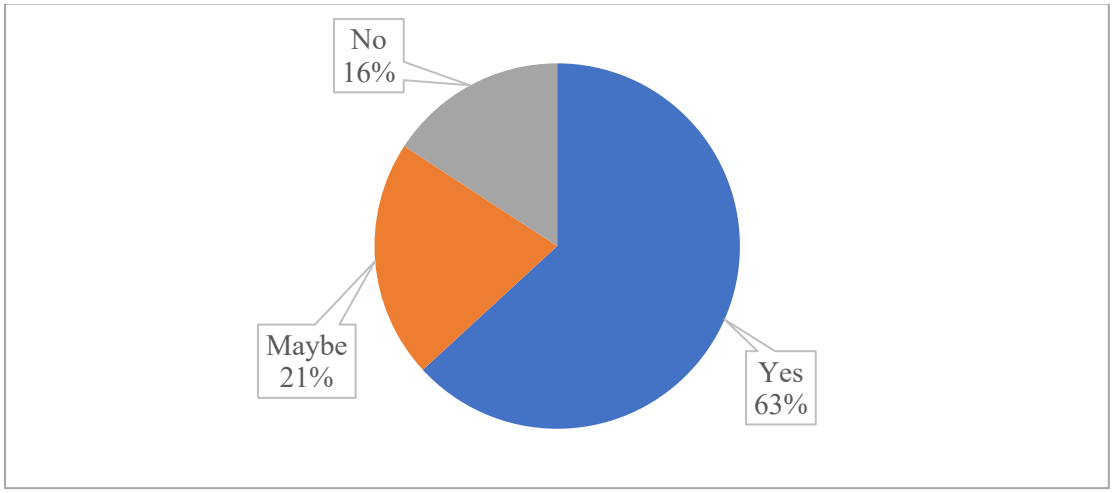

Figure 3-34 Would you be encouraged to use public transportation more with assistance from Aira agents? (n=37)

Aira users were asked about the limitations of Aira services through a series of questions in the follow-up survey. Please note that the responses on the limitations of Aira services/app may be biased. First, the follow-up survey was conducted on the active Aira users in March and April 2023. Therefore, users who did not find the Aira services helpful for their purpose may have already stopped using Aira services before the deployment of the follow-up survey. Second, the follow-up survey was conducted with the assistance of the Aira live agents. This may have biased user response due to questions regarding issues with Aira services.

Aira users were asked to rate the convenience of using the Aira app on a scale from 0 to 10, with 10 being the most user-friendly. The distribution of Aira users' ratings of the Aira smartphone app is provided in Figure 3-35. More than 40% of users indicated that the Aira app is very user-friendly. A small number of current Aira users indicated that the Aira app is not user-friendly, rating the app less than 5 out of 10. Survey respondents were asked whether they faced any issues while using Aira services. The distribution of survey responses presented in Figure 3-36 (a) indicate that around 41% of the Aira users experienced issues. Figure 3-36 (b) presents the distribution of issues experienced by promotional Aira users showing that the most frequent issues were long wait times to speak with an agent and frequent call disconnection. The respondents also provided text responses listed as "Other" in Figure 3-36 (b). A review of text responses revealed that some difficulties included Aira asking to validate the promotional offer codes multiple times, difficulty finding the promo code needed to use the service, switching agents in between calls as the agent's shift was ending, and the unwillingness of Aira agents to provide assistance in some areas as the service was provided through promotional services.

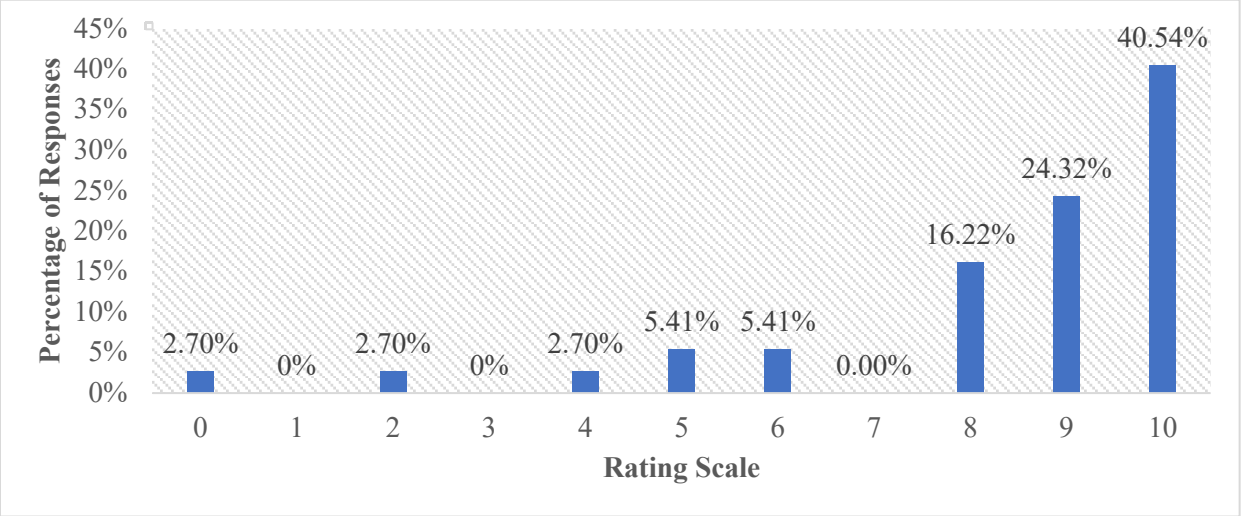

Figure 3-35 How user friendly would you rate the Aira app? (n=37)

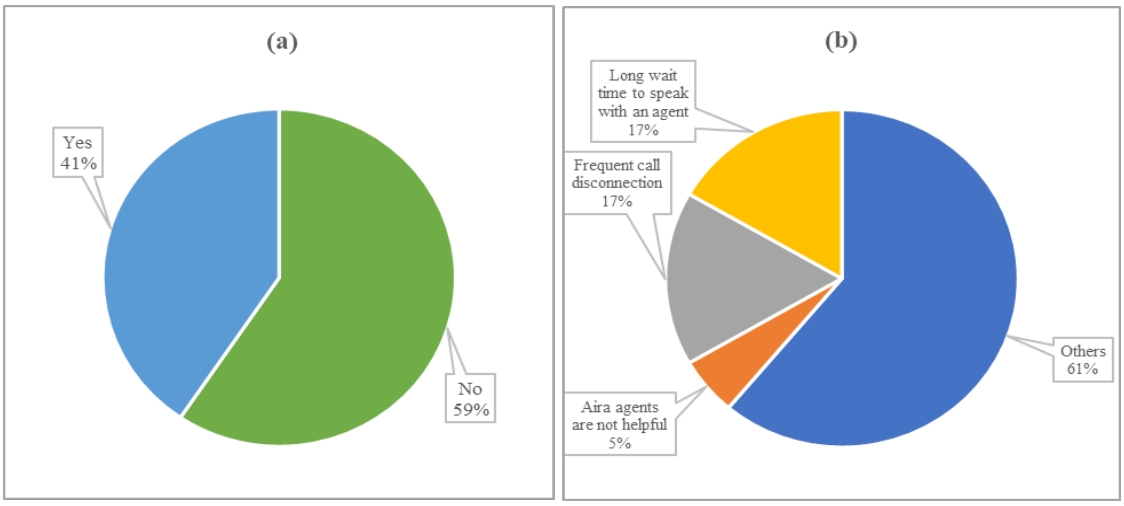

Figure 3-36 (a) Did you experience any issues while using Aira services?; (b) What was the most frequent issue you experienced with Aira service? (n=37)

Users were also asked about shortcomings of the Aira app. Figure 3-37 indicates a very small amount of respondents stated that the Aira app was confusing and not user-friendly, whereas a significant amount the respondents indicated that Aira services are costly and not affordable to them. The respondents that provided a text response also indicated that they experienced issues installing the Aira app on their smartphones. There was also a response that Aira also does not work with Uber, forcing participants to use Lyft even if the wait time for Lyft is too long, or otherwise inconvenient.

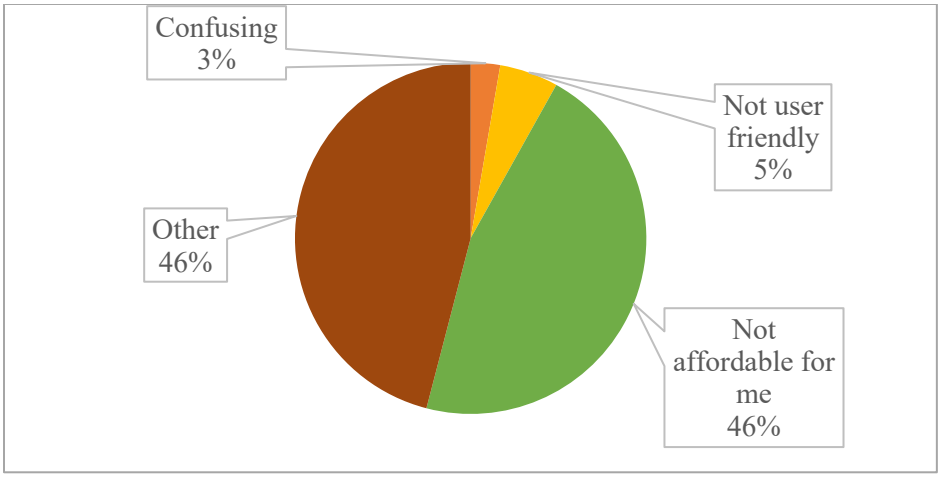

Figure 3-37 What are the shortcomings of Aira App? (n=16)

Finally, survey respondents were asked whether or not they will recommend the Aira services to their visually-impaired friends. Figure 3-38 indicates that most Aira users have already recommended the Aira service to their visually-impaired friends. One survey respondent noted that they received information from Aira stating that Aira may not work properly with iPhones if

a user is using the promotional services. As the user and his visually-impaired friends use iPhones, he stated that he would not recommend the service to his friends. Figure 3-39 presents the distribution of responses to the question about whether the user would continue to use Aira if they had to pay for the service. Survey responses indicated that while 53% of the current Aira users will continue to use the Aira service after the promotional period, almost half of the respondents may not use the service if they must pay for the service.

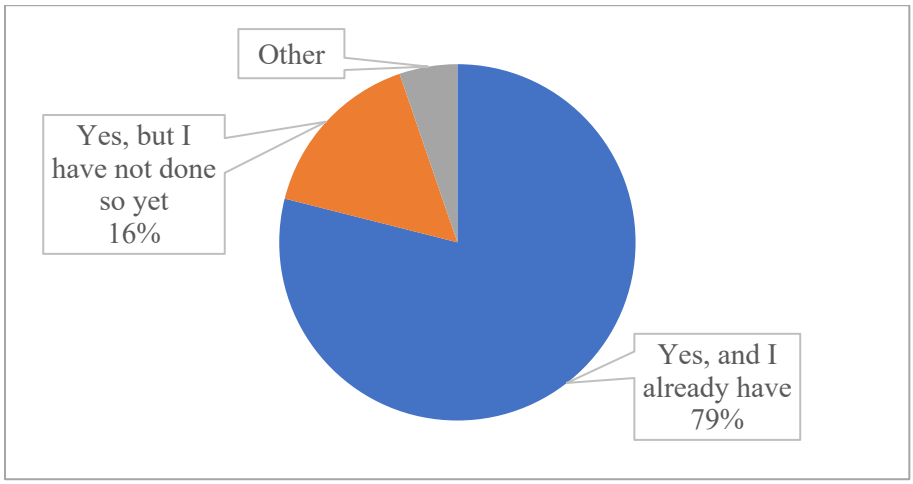

Figure 3-38 Will you recommend the Aira service to your visually-impaired friends? (n=38)

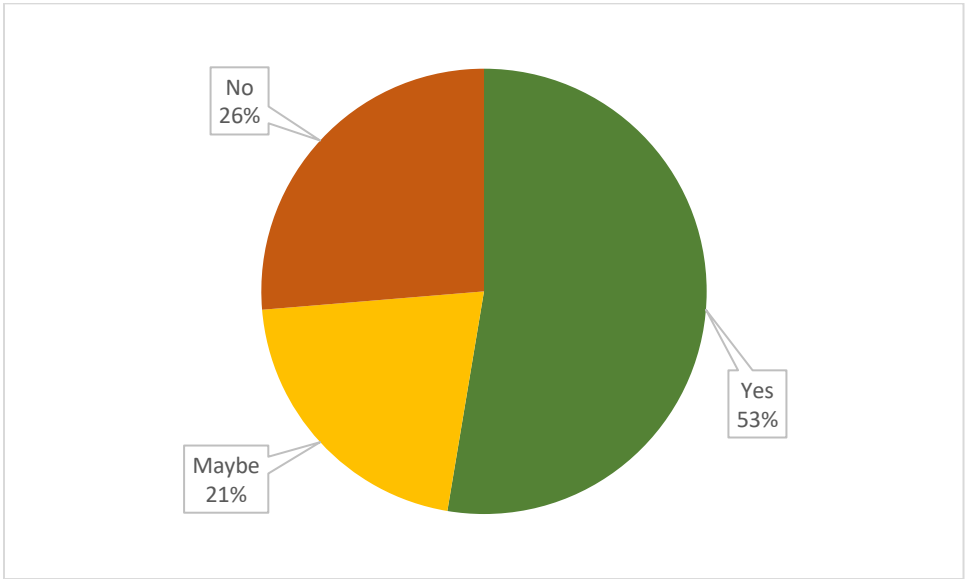

Figure 3-39 Will you continue to use Aira if you have to pay for this service? (n=38)

The follow-up survey collected demographic information of Aira users who responded to the follow-up survey. The section includes questions about age, race, gender, income, education, and employment status to have a better understanding of the demographic profile of the Aira users who used the Connecticut promotional services. The distributions of survey responses for the questions

related to the responder's socioeconomic and demographic status are presented in Figure 3-40. A summary of the responses to the socioeconomic and demographic status-related questions is provided below:

- There is a higher proportion of females compared to males who used Aira promotional services in Connecticut. The distribution is also consistent with the findings from the initial travel and mobility questionnaire survey.
- A majority of visually-impaired individuals who used Aira services were White (77%).
- About 83% of the survey respondents indicated that they do not belong to Hispanic, Latino, or Spanish origins.
- Most of the follow-up survey respondents are over 50 years old.
- The distribution of employment status indicated that over half of the participants were either retired or unemployed. This may be because most survey respondents are older adults.
- A significant portion of survey respondents did not provide household income information. Among the survey participants that responded to this question, the largest group (62.5%) reported an income of under $50,000. This suggests that a sizable portion of visually-impaired individuals may face financial limitations, which could impact their ability to afford certain services or resources.
- Most of the survey respondents had a household size of one or two people.

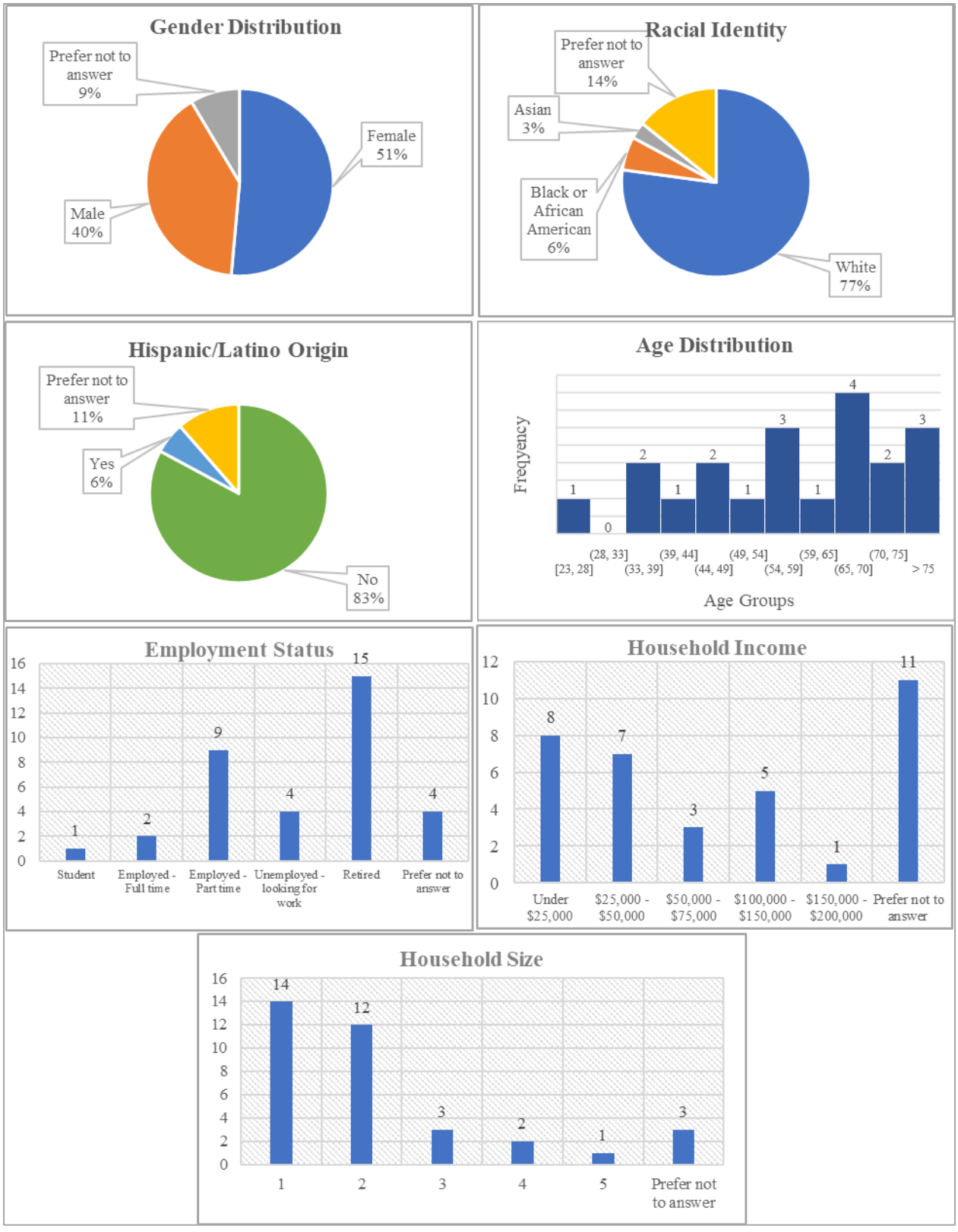

Figure 3-40 Distribution of Socioeconomic and Demographic Characteristics. (n=33)

Based on responses to the follow-up survey questionnaire, the key takeaways are summarized below:

- A significant proportion of the respondents (72%) identified as having either total blindness or near-total blindness. The level of visual impairment found in the follow-up survey indicated higher severity of visual impairment compared to the survey responses collected at the beginning of this project.
- A majority of the visually-impaired Aira users used a cane and assistive applications other than Aira on smartphone. The number of participants who have used other assistive apps are already familiar with assistive technology-related applications that can support specific tasks. This observation indicates participants that are already using assistive apps other than Aira may have enabled them to use Aira services as well.
- Survey responses indicated that more than 36% of Aira users are very comfortable using smartphones.
- Although the availability of the promotional services was advertised through the CTRides website, CTDOT, and BESB, more than 53% of the current users learned about Aira services from their friends. The survey respondents also indicated that they learned about Aira services from the National Federation of the Blind conference.
- Most users used Aira's virtual visual assistance for transportation/ navigation. This finding is contradictory compared to task purposes found in Aira call records presented in Section 3.2.3 of only 6% reported for navigation. However, many users also used Aira services for reading documents and online tasks. The "Other" category includes finding household/medical items, finding lost items, labeling items, etc.
- Most of the respondents travel almost daily and travel alone. Aira's visual virtual assistance can be beneficial to the BLV community to help them travel safely.
- About one-third of the respondents used buses and trains as travel modes. Among these respondents, about 67% of the survey respondents indicated that the Aira service was helpful in using public transportation, while 27% of the survey respondents indicated that they did not use Aira service for using public transportation at all.
- Around 63% of the respondents may use public transportation more with Aira services which are very similar to the percentage of respondents who had positive feedback about using Aira services for travel (67%). 21% of the respondents were not sure if their use of public transport would change, and 16% indicated that they will not increase their use of public transportation with Aira services.
- More than 40% of users indicated that the Aira app is very user-friendly.
- Approximately 41% of the Aira users experienced issues while using Aira services, among which 17% of respondents reported long wait times to speak with an agent and frequent call disconnection. A review of text responses revealed that Aira asked to validate promotional offer codes multiple times, had difficulty finding the promo code for the service, switched agents in between calls as the agent's shift was ending, and stated that Aira agents were unwilling to provide assistance in some areas as the service was provided

through promotional services.

- The responses on the limitations of Aira services/app may be biased since the follow-up survey was conducted on the users who were using the app in April 2023. Most users who did not find Aira services helpful may have already stopped using Aira before the deployment of the follow-up survey. The follow-up survey was also conducted with the assistance of the Aira live agents potentially creating decision bias while responding to the questions relating to issues with Aira services from the survey respondents.
- A majority of respondents indicated that Aira services are costly and not affordable to them. The respondents that provided a text response also indicated that they experienced issues while installing Aira app on their smartphones. Aira also does not work with Uber, so the user has to use Lyft, even if the wait time for Lyft is too long or otherwise inconvenient.
- One survey respondent noted that the user received information from an Aira agent that Aira may not work properly with iPhones if a user is using promotional services (this has not been verified with Aira to be accurate).
- While 53% of current Aira users will continue to use Aira services after the promotional period, almost half of the respondents may not use the service if they have to pay for the service.

3.4 Cost Evaluation

The state of Connecticut paid Aira Corp. $250,000 to provide virtual visual assistance service for 18 months free of charge to blind or visually-impaired individuals in the state. Within the 18 months, a total of 4,390 calls were made to Aira with total call duration of 58,021 minutes by 63 users from Connecticut. Based on the total usage, the summary statistics of Aira usage are as follows:

- Total number of calls: 4,390
- Total call duration: 58,021 minutes
- Number of calls per month: 423.9
- Average call duration per month: 3223.4 minutes
- Average number of calls per user: 70 (~4 call per month per user)
- Average call duration per user: 921 minutes (~51 minutes per month per user)

Based on total Aira usage statistics, the cost of calls for the pilot implementation was $4.30 per minute and roughly $3,968 per individual ($220 per individual per month). This resultant cost per user is almost eight times higher than the approximated $500 cost per user assumed at the start of the pilot program. The pilot virtual assistance services from Aira Corp. was paid for by the State of Connecticut. Outside of this pilot program, users need to purchase a service plan from Aira to be able to use the service. The cost structure for existing service plans offered by Aira Corp. is provided in Table 3-1.

Table 3-1 Details of Existing Aira Service Plans Available for Purchase.

Plan Name	Monthly Minutes	Retail Cost	Discounted Cost	Cost per Minute	Total Pilot Cost*
Silver 1-Star	15	$65	$26	$1.73	$100,570
Silver 2-Stars	30	$125	$50	$1.67	$96,702
Silver 3-Stars	50	$210	$84	$1.68	$97,475
Gold 1-Star	80	$330	$132	$1.65	$95,735
Gold 2-Stars	120	$500	$200	$1.67	$96,702
Gold 3-Stars	220	$890	$356	$1.62	$93,889
Platinum 1-Star	300	$1,200	$480	$1.6	$92,834
Platinum 2-Stars	500	$1,900	$760	$1.52	$88,191
Platinum 3-Stars	800	$2,900	$1,160	$1.45	$84,130

*Note: Total pilot cost is estimated using discounted cost.

As noted in Table 3-1, there are nine Aira Service plants available for purchase by individuals. Aira currently offers three plan types: Silver, Gold and Platinum. Within each plan type, there are three levels: 1-star, 2-stars and 3-stars. The number of monthly minutes increase at each level and within each plan type from 1 to 2 to 3-stars. Except the Silver 1-star plan, all other plans can be shared from two to five users. As illustrated in Table 3-1, a user may not need to pay a retail price for a specific plan as a discounted price is available for each plan after Aira's contribution.

As noted in Section 2.1, it was estimated that a total of 500 users from Connecticut would use Aira services resulting in an estimate of $500 in monetary benefit to each user paid for by the State. However, the pilot program was only able to enroll 63 users, only 12.6% of the targeted 500 users. Considering lower enrollment in the promotional virtual assistance services, Aira services were underused based on the amount paid to Aira Corp. by the State of Connecticut. As indicated in Table 3-1, the calculated total pilot usage cost was $100,570, if purchased by minutes with the most expensive available price plan from Aira. As noted above, the average call duration per user per month was 51 minutes which can be accommodated using "Gold 1-Star" plan from Aira. Purchasing the "Gold 1-Star" plan for 63 users for 18 months would have cost $149,688. Therefore, the State of Connecticut overpaid for the services used by BLV individuals in Connecticut over the promotional period. Extrapolating from actual usage data, the total usage minutes would have been more than 460,000 minutes if the pilot was able to enroll 500 users to use Aira services. In such a case, users from Connecticut would have used nearly $800,000 worth of services from Aira while the State only paid $250,000 to Aira Corp.

Based on the usage distribution, the distribution of Aira usage, in terms of call minutes by user, is highly skewed by the "Super User". As noted in Section 3.2.2, the "Super User" was responsible for 60% of the total usage minutes during the pilot program. The cost of usage from the "Super

User" was approximately $150,000 (60% of $250,000) for the State. However, the UConn project team and partners were not aware of such a user dominating and was identified from Aira usage data after the end of promotional period. This observation indicates a significant disparity in the resource allocation among the registered users. Usage limits should be defined and implemented to prevent any user from monopolizing the service provided by the State. By imposing usage limits, the State/service provider can ensure fair and equitable access for all users, preventing excessive consumption and promoting a more balanced distribution of resources.

CHAPTER 4 SUMMARY AND RECOMMENDATIONS

The goal of this project was to implement Aira visual assistance services across the entire State of Connecticut. Visual assistance was to be used for navigation, wayfinding, using public transportation, and ensuring proper social distancing for BLV individuals. In this regard, the UConn project team worked with the Connecticut Department of Transportation, Connecticut ADS- BESB, and Aira Corp. in implementing Aira services, conducting outreach activities, developing questionnaire surveys, and collecting, processing, and analyzing survey responses.

The UConn project team conducted a preliminary survey to understand the travel patterns and barriers faced by BLV individuals in Connecticut. The questionnaire was deployed at the beginning of the project and survey responses were collected until March 2023. To evaluate the effectiveness of Aira services in Connecticut, the UConn project team also collected Aira usage data from Aira and conducted a follow-up survey to collect user feedback on Aira services. The follow-up survey was deployed in March 2023 and survey responses were collected until April 2023. All survey responses and Aira usage data were analyzed by the UConn project team. The following sections provide a summary of takeaways from the preliminary survey, Aira usage data, and follow-up survey.

4.1 Summary of Preliminary Travel Behavior Survey

A preliminary questionnaire survey was conducted to understand the travel patterns and barriers faced by visually-impaired individuals living in Connecticut. The survey questionnaire comprised four main sections: level of blindness, travel behavior, travel aids, paratransit, and demographics. This approach allowed for a detailed analysis of the data collected and provided a holistic understanding of the factors that affect the travel experience of visually-impaired individuals. The key takeaways from the preliminary survey are summarized below:

- Over 53% of the survey respondents identified as having either total blindness or near-total blindness, indicating a majority of the participants may require significant support and assistance to accomplish everyday tasks.
- 47% of visually-impaired individuals in Connecticut leave their homes five to seven days a week. Moreover, a considerable proportion of visually-impaired individuals rarely or never go out alone, suggesting a need for additional support or assistance during their outings. About 43.4% of the visually-impaired responders reported a great deal of difficulty navigating unfamiliar environments which highlights the need for specialized assistance in these situations.
- A vast majority (97%) of visually-impaired individuals have access to a smartphone, indicating that smartphone technology could potentially serve as a valuable tool to assist visually-impaired individuals in daily activities as well as navigating transportation systems.

- There is a lack of awareness among visually-impaired individuals regarding the availability of training services and regional mobility managers with 86% of participants not knowing that these resources are available.
- Existing barriers faced by visually-impaired individuals include: difficulty finding bus stops, determining the correct bus stop, inability to see and/or read bus numbers and street announcements, unclear or confusing schedules, routes, or pricing, difficulty locating the door or available seats when entering a bus, challenges transferring between buses or trains particularly at hubs or transfer points, safety concerns when crossing busy roads to get to bus stops, limited accessibility or orientation for individuals with disabilities; hostility or unhelpfulness from bus drivers or other passengers, challenges in navigating large bus or train stations, concerns about missing stops or getting off at the wrong location, and limited or inaccurate public transportation information
- Feedback provided by survey respondents for improving public transportation options in Connecticut are: marking bus stops with tactile markers, GPS markers should be placed to notify visually-impaired people when they approach a bus stop, assistance from sighted people for navigating public transportation, and equipment that can help visually-impaired people see from far distances would be helpful, loud environments and crowded areas make it difficult for visually-impaired people to navigate, some bus stops lack audible cues, and limited transportation options can make it difficult to access government services and city offices.
- About half of the respondents are willing to consider public transportation services as an alternative to ADA Paratransit service if live, virtual visual assistance is provided.
- Most respondents are over 60 years old and are either retired or unemployed, suggesting a potential need for additional assistance at an affordable price for older adults in everyday tasks.

The preliminary travel behavior survey provided insight into the barriers faced by blind or visually-impaired individuals in Connecticut. The survey results indicated a series of issues experienced by visually-impaired individuals when using public transportation options. Feedback from survey respondents can also be used as future development alternatives to make the public transportation centers such as bus/train stops and transit hubs more accessible for visually-impaired individuals. Moreover, affordable assistance solutions need to be identified to assist visually-impaired individuals in completing daily activities considering the majority of the visually-impaired population are aged more than 60 years and either unemployed or retired.

4.2 Effectiveness of Aira Services

The UConn project team collected Aira service usage data from Aira and conducted a follow-up survey to collect user feedback on the services received to evaluate the effectiveness of the

promotional Aira services in Connecticut. The key takeaways from the Aira usage data analysis and follow-up survey are summarized below:

- Although 184 visually-impaired participants responded to the primary travel pattern and mobility survey, only a total of 63 participants registered for the promotional Aira services. This observation indicated a lack of awareness among visually-impaired individuals about the services and benefits provided by the state.
- As CT BESB registry has over 5,000 clients who were targeted for the Aira pilot implementation in Connecticut, Aira was unable to attract more than 1% of the blind or visually-impaired individuals in Connecticut. Factors such as staying home due to COVID-19, using available delivery services for groceries, other essential items, etc. may also have affected the enrollment in the promotional offer.
- Out of 63 unique users who registered for Aira's promotional services, there were 4,391 calls made to Aira by active Aira users. The "Super User" made 1,765 calls (39.1% of all calls) to Aira which corresponds to 34,733 minutes of calls out of 58,021 minutes of total calls over the promotional period (60% of the total call duration).
- Aira usage for the rest of the promotional users without considering the "Super User" is very minimal.
- The highest proportion of calls made to Aira agents involved assistance with "Online Tasks" such as hiring Uber/ Lyft, drafting emails, filling out applications, etc. The Aira virtual visual assistance services were rarely used for utilizing public transportation services by promotional users. This observation may not be completely true as the call purposes were assigned by the Aira agents categorized bus/train schedules as "Reading" or "Online Tasks."
- Aira virtual agents were able to complete the user-desired task in 81% of all calls. Most calls that were flagged as unsuccessful were related to call disconnection, lost call audio, or the user found someone during the call to physically assist with the task.
- A few users also left negative feedback after their call such as "Call was dropped," "She found the wrong car," "He could be more responsive when talking to him," "No audio," "Lost connection," etc.
- A considerable proportion of respondents identified as having either total blindness or near-total blindness combining to represent over 72% of responses. The level of visual impairment found in the follow-up survey indicated higher severity of visual impairment compared to the survey responses collected at the beginning of this project.
- A majority of visually-impaired Aira users used a cane and assistive applications other than Aira on smartphone. A large number of participants used assistive apps other than Aira indicating that the users are already familiar with assistive services enabling them to use Aira services as well. Survey responses also indicated that 36.36% of Aira users are very comfortable using smartphones.
- Although the availability of the promotional services was advertised through the CTRides website, CTDOT, and BESB, more than 53% of the current users learned about Aira

services from their friends. The survey respondents also indicated that they learned about Aira services from the National Federation of the Blind conference.

- Most users used Aira's virtual visual assistance for transportation/ navigation. This finding is contradictory compared to task purposes found in Aira call records presented in Section 3.2.3. However, a significant number of participants used Aira services for reading documents and online tasks too. The "Other" category includes finding household/medical items, finding lost items, labeling items, etc.
- About one-third of the respondents used buses and trains as travel modes. Among these respondents, around 67% indicated that Aira services were helpful while using public transportation. 27% of the survey respondents indicated that they did not use Aira service for using public transportation at all.
- About 63% of the respondents may use public transportation more with Aira services which are very similar to the percentage of respondents who had positive feedback about using Aira services for travel (67%). Approximately 21% of the respondents were not sure and 16% indicated that they will not use public transportation more with Aira services.
- 41% of Aira users experienced issues while using Aira services, among which 17% of respondents reported long wait times to speak with an agent and frequent call disconnection. A review of text responses revealed that Aira asked to validate promotional offer codes multiple times, had difficulty finding the promo code for the service, switched agents in between calls as the agent's shift was ending, and an unwillingness of Aira agents to provide assistance in some areas as the service was provided through promotional services.
- A majority of the respondents indicated that Aira services are costly and not affordable to them. The respondents that provided a text response also indicated that they experienced issues while installing Aira app on their smartphones. Aira also does not work with Uber so the user has to use Lyft even if the wait time for Lyft is too long or otherwise inconvenient. One survey respondent noted that they received information from Aira that Aira may not work properly with iPhones if a user is using promotional services.
- While 53% of the current Aira users will continue to use the Aira service after the promotional period, almost half of the respondents may not use the service if they have to pay for it.

Based on the key takeaways from the Aira usage data and follow-up survey results, it is evident that there was a lack of awareness among visually-impaired individuals regarding the availability of promotional visual assistance services provided by the state. More user campaigns and extensive publicity were needed to inform visually-impaired individuals in advance about the availability of such services. Based on the feedback received from users, Aira agents accomplished the target task in most cases. However, it is important to note that one of the major reasons behind this project was because CT BESB wanted to use Aira to help BLV individuals in maintaining social distance. The use of Aira services was also promoted as a key usage to maintain social distance due to

COVID-19. Unfortunately, the project team did not ask any survey questions related to effectiveness of Aira services in maintaining social distance as the user enrollment was low. Thus, no inferences can be drawn related to effectiveness of Aira services in maintaining social distance due to COVID-19.

4.3 Future Recommendations

Based on the findings from the preliminary questionnaire survey, Aira usage data analysis, and follow-up questionnaire survey, recommendations for the future are summarized below:

- It is evident that there is a need for virtual assistance services to assist blind or visually-impaired individuals while accessing essential services. The feedback and input received provided significant insight into the daily needs and barriers faced while traveling. As a considerable proportion of visually-impaired individuals either live alone or live in small households, they may need visual assistance to complete everyday tasks and to independently navigate their surroundings.
- Aira usage indicated that the visual assistance needs and requirements of participants can range from assistance with navigation/transportation to needing visual information while completing household task such as finding lost items, etc. Focus group surveys should be conducted by ADS-BESB with their clients to better understand the variety of needs and requirements of visually-impaired individuals to provide more appropriate or cost-effective services that can meet the variety of needs of visually-impaired individuals.
- Despite significant promotional and outreach activities, the virtual mobility assistance services provided by Aira Corp. were not able to attract a significant number of users, even though the service was free to use. This finding indicated that usual promotional media to advertise may not be sufficient to inform blind or visually-impaired individuals of new services. A more rigorous promotional plan needs to be developed and promoted in advance to inform about the availability of assistance services in the future.
- Due to low user enrollment, Aira services were underused compared to the payment made by the State of Connecticut. A model of payment should be developed in the future to ensure that promotional services sponsored by a state agency are appropriately used. For example, a model for payment to Aira Corp. based on minutes used during the pilot implementation would have saved the state of Connecticut 60% of their investment. Future implementation should consider uncertainties of use and user enrollment and work to develop an appropriate model for payment instead of providing a lump-sum payment.
- Based on the Aira usage data, the “Super User” was responsible for using 60% of the total usage minutes over the 18-months period. Specific instructions should be put in place for future deployment of assistance services ensuring that no one user will be able to overuse services paid for by the State.
- This project was conducted in cooperation with CT ADS-BESB. It is important to note there were a number of retirements and staffing changes that could have impacted the

success of AIRA marketing and adoption. Due to retirement and changes in staffing, there were potentially missed opportunities where more assistance and might have been beneficial in increasing the number of Aira users in the pilot program. For example, ADS-BESB maintains a client registry for all registered visually-impaired individuals in Connecticut. ADS-BESB was not able to share their client roaster with the project team since the client registry contained personally identifiable information. In the future, ADS-BESB might be able to increase promotion of available services in daily interactions with their clients, focus groups, workshops, and promotions.

- A few users noted significant issues with the promotional Aira services. While the feedback provided by Aira users may have resulted from unfortunate and unexpected events, future programs should be frequently monitored to ensure that services are appropriately provided to the users.
- Low adoption rates made the development of valid and meaningful conclusions difficult. The pilot program was intended to include multiple follow-up surveys. Unfortunately, the project team was unable to conduct these surveys due to low user registration to the free Aira service.
- Although Aira services were provided for free during the pilot program, users were informed by Aira agents that they may need to pay for Aira services after the expiration of the promotional offer. Based on the survey responses received, a majority of the visually-impaired individuals in Connecticut are either unemployed or retired as well as aged more than 50 years old. Considering the financial conditions of visually-impaired individuals reflected in this study, more affordable or discounted visual assistance services should be considered in the future to make sure the user continue to use these services even after the expiration of the promotional period.

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APPENDICES

APPENDIX A

Included Essential Services and Related Activities that the CT Aira Pilot Program will Cover: October 15, 2021 – March 15, 2023

Transportation including:

- Bus
- Rail
- Bradley International Airport
- Taxi/ Livery/ On demand ride service
- Paratransit
- Dial-a-ride service
- Rideshare
- Ferry

Healthcare and related operations including:

- Doctor and dentist offices
- Eldercare, including adult daycare
- Hospitals
- Pharmacies
- Physical therapy and chiropractic offices
- Mental Health Services
- Veterinary and animal health services
- Walk-in-care health facilities
- Research and laboratory services, including testing and treatment of COVID-19

Retail including:

- Appliances, electronics, computers, and telecom equipment
- Big-box stores or wholesale clubs
    - Provided they also sell groceries, consumer health products, or operate a pharmacy
- Convenience stores/Gas Stations
- Grocery stores including all food and beverage retailers
- Hardware, paint, and building material stores, including home appliance sales/repair
- Pharmacies
- Cell phone retailers
- Pet and pet supply stores
- Online shopping for any of the above

Food and agriculture, including:

- Farms and farmer's markets
- Nurseries, garden centers, and agriculture supply stores
- Restaurants, online ordering for delivery and takeout

Services including:

- Animal shelters or animal care or management, including boarding, grooming, pet walking, and pet sitting
- Auto supply, repair, towing, and service, including roadside assistance
- Bicycle repair and service
- Childcare services
- Internet, cable and, phone services
- Utility services
- Financial institutions, including banks, credit unions and check cashing services
- Funeral homes, crematoriums, and cemeteries
- Laundromats/dry cleaning
- Legal and accounting services
- Mail and shipping services
- Food banks
- Homeless shelters and congregate care facilities
- Human services
- Municipal, state, and federal services
- Voting and registration
- Religious Services

Reading mail for or about any of the above listed services.

APPENDIX B

Preliminary Travel Behavior Survey Questionnaire

Introduction

You are invited to participate in a research study to share your experiences with public transportation in Connecticut and challenges faced during travel. We are conducting this research on behalf of the Connecticut Department of Transportation (CTDOT), the Department of Aging and Disability Services-Bureau of Education and Services for the Blind (BESB), and Aira. CTDOT and BESB are interested in learning about the mobility and independence of individuals with blindness or low vision (BLV) in Connecticut. The results of this survey may be used to guide future efforts to provide resources to assist BLV individuals with safe and secure travel. The results of this survey will also be used to evaluate Aira services. This form includes information about the study, and contact information for the researchers if you have any questions.

Why is this study being done?

We are conducting this study to learn more about the travel patterns and challenges experienced by the BLV community. We are interested in learning about the frequency, purpose, and modes of travel, as well as the challenges experienced while using public transportation, paratransit, etc.

What are the study procedures? What will I be asked to do?

If you agree to take part in this study, you will be asked to complete a confidential survey on the next screen. Survey questions will cover topics related to your level of blindness, travel techniques you utilize , challenges experienced in your personal mobility, use of travel aid devices/services, and demographic information. The survey questions are in multiple-choice and short answer form. To maintain your confidentiality, you should not write anything that would identify you personally in the short answer questions. The survey should take approximately 20 minutes to complete. There are no time restrictions – feel free to take as long as you need to read through this consent form and complete the survey.

What are the risks or inconveniences of the study?

There are no anticipated risks to you for participating in the study. All information you share in this survey will be kept confidential. It will not be associated with any identifying information (name, address, etc.). The only inconvenience is the time required to complete the survey.

What are the benefits of the study?

By participating in this study, you will gain free access to Aira services during the pilot period (estimated October 2021 – March 2023), valued at approximately $500. Your participation in the study will also benefit the state of Connecticut, CTDOT, and BESB through better understanding of the travel patterns and opinions of the BLV community. The results of this study have the potential to help shape future provisions and resource allocation related to the mobility of the BLV community in Connecticut.

Will I receive payment for participation? Are there costs to participate?

There are no costs to participate, and you will not be paid to be in this study. By participating in this study, you will not be charged for use of the Aira service. For the study period, this service is valued at approximately $500.

How will my personal information be protected?

The following procedures will be used to protect the confidentiality of your data. The researchers will keep all study records (including any codes to your data) on a secure server in a location with restricted access. Consent forms will be stored separately from other data. All electronic files (e.g., database, spreadsheet, etc.) containing participant information will be password protected. Any computer hosting such files will also have password protection to prevent access by unauthorized users and baseline hardening measures in place. Only the members of the research staff will have access to the passwords. At the conclusion of this study, the researchers will share the results with CTDOT, BESB, and Aira, and may publish their findings. Study results will be presented in summary format only, and you will not be identified in any publications or presentations associated with this research. We will do our best to protect the confidentiality of the information we gather as part of the survey from you, but we cannot guarantee 100% confidentiality. Your confidentiality will be maintained to the degree permitted by the technology used. Specifically, no guarantees can be made regarding the interception of data sent via the Internet by any third parties. You should also know that the UConn Institutional Review Board (IRB) and the Office of Research Compliance may inspect study records as part of its auditing program, but these reviews will only focus on the researchers and not on your responses or involvement. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.

Can I stop participating in the study and what are my rights?

Yes. You do not have to participate this study if you do not want to. If you participate in the

study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate. You are not required to answer any questions that you do not want to.

Who do I contact if I have questions about the study?
We will be happy to answer any question you have about this study. If you have questions about this study, or if you have a research-related problem, you may contact the principal investigator, Mohammad Razaur Rahman Shaon, Ph.D. (605-690-0810 or mrr.shaon@uconn.edu), the Co-PI, Niloufar Shirani, Ph.D. (256-797-2244 or niloufar.shirani@uconn.edu) or the key personnel, Andrew Tucker, Ph.D. (860-486-9069 or andrew.tucker@uconn.edu). If you have any questions concerning your rights as a research participant, you may contact the University of Connecticut Institutional Review Board (IRB) at 860-486-8802.

Survey Questions

1. Have you read the above and do you consent to participate in the study?
   (a) Yes
   (b) No

2. Are you a current resident of Connecticut?
   (a) Yes
   (b) No

3. Are you 18 years old?
   (a) Yes
   (b) No

4. What is your level of vision?
   (a) Not visually-impaired
   (b) Moderate low vision
   (c) Severe low vision
   (d) Near total blindness
   (e) Total blindness

5. How long have you been visually-impaired?
   (a) Less than 1 year
   (b) 1 to 5 years
   (c) 6 to 10 years
   (d) More than 10 years
   (e) My entire life

6. How often have you left your home in the last year?
   (a) 5 to 7 days a week
   (b) A few times a week
   (c) A few times a month
   (d) Once a month or less

7. How often do you go out alone?
   (a) Always
   (b) Sometimes
   (c) Rarely
   (d) Never

For the next several questions, please indicate how often you use the indicated mode of transportation.

Questions	**Never**	**Rarely**	**Sometimes**	**Often**
8. Driving myself	☐	☐	☐	☐
9. Driven by friend, family member, coworker, etc.	☐	☐	☐	☐
10. Rideshare (Uber, Lyft, etc.)	☐	☐	☐	☐
11. Door-to-door pick-up service (e.g. Access-a-Ride) or Paratransit	☐	☐	☐	☐
12. Bus	☐	☐	☐	☐
13. Train	☐	☐	☐	☐
14. Bike	☐	☐	☐	☐
15. Walking without sighted assistance	☐	☐	☐	☐
16. Walking with sighted assistance	☐	☐	☐	☐

For the next several questions, please indicate your level of agreement or disagreement with the following statements. Due to my visual impairment, I...

Statements	**Strongly disagree**	**Disagree**	**Neither agree or disagree**	**Agree**	**Strongly agree**
17. Limit how often I travel	☐	☐	☐	☐	☐
18. Limit the hours during which I travel	☐	☐	☐	☐	☐
19. Limit my use of public transit	☐	☐	☐	☐	☐

20. Ask others for assistance with travel	☐	☐	☐	☐	☐

How much difficulty would you say you have in completing the following tasks?

Questions	**None**	**A little**	**A moderate amount**	**A great deal**
21. Walking along streets	☐	☐	☐	☐
22. Crossing streets	☐	☐	☐	☐
23. Using stairs	☐	☐	☐	☐
24. Navigate parking lots	☐	☐	☐	☐
25. Getting around train or bus stations?	☐	☐	☐	☐
26. Re-establishing orientation if lost?	☐	☐	☐	☐
27. Traveling in familiar environments?	☐	☐	☐	☐
28. Traveling in unfamiliar environments?	☐	☐	☐	☐

29. What challenges have you experienced using regular public transit services?
(Text response) _____

30. Do you have any other comments or feedback regarding your transportation options?
(Text response) _____

31. Please list any forms of assistance (e.g. cane, guide dog, smartphone apps, etc.) you use while traveling.
(Text response) _____

32. Do you have a smartphone?
    (a) No
    (b) Yes

33. If you have a smartphone, please list the names of any smartphone apps, services, or GPS devices you have used for assistance while traveling.
(Text response) _____

34. Have you worked with a regional mobility manager or taken advantage of travel training for public transportation through the Kennedy Center?
    (a) Yes
    (b) No - I was not aware of these services.
    (c) No - I am aware, but do not use them.

35. If you use door-to-door pick-up service (e.g. Access-a-Ride) or paratransit, how satisfied are you with the service from Connecticut ADA Paratransit?
    (a) Extremely dissatisfied
    (b) Somewhat dissatisfied
    (c) Neither satisfied nor dissatisfied
    (d) Somewhat satisfied
    (e) Extremely satisfied

36. If you use door-to-door pick-up service (e.g. Access-a-Ride) or paratransit, what challenges have you experienced in using the ADA Paratransit service?
    (a) Long hold on phone call
    (b) Long wait time for transit pickup or drop-off
    (c) Ride does not show up after being scheduled
    (d) Challenging pickup or drop-off locations
    (e) Other (please specify)

37. 37. If you use door-to-door pick-up service (e.g. Access-a-Ride) or paratransit, would you consider using regular public transit service as an alternative to the ADA Paratransit service if live, virtual visual assistance were provided?
    (a) Yes
    (b) Maybe
    (c) No

Please answer the following demographic questions (optional):

38. What is your age?

39. What is your gender identity?

40. What is your racial identity?
    (a) White
    (b) Black or African American
    (c) American Indian or Alaska Native
    (d) Asian
    (e) Native Hawaiian or Pacific Islander
    (f) Other
    (g) Prefer not to answer

41. Are you of Hispanic, Latino, or Spanish origin?

(a) Yes
(b) No
(c) Prefer not to answer

42. What level of education have you completed?
(a) 11th grade or lower
(b) High school graduate / GED
(c) Some college or vocational school
(d) 2-year college degree
(e) 4-year college degree
(f) Graduate or professional degree
(g) Doctorate
(h) Prefer not to answer

43. What is your current employment status? Please select all that apply.
(a) Employed full time
(b) Employed part time
(c) Unemployed looking for work
(d) Unemployed not looking for work
(e) Retired
(f) Student
(g) Prefer not to answer

44. To the best of your knowledge, what is your total household income?
(a) Under $25,000 (1)
(b) $25,000 - $35,000 (2)
(c) $35,000 - $50,000 (3)
(d) $50,000 - $75,000 (4)
(e) $75,000 - $100,000 (5)
(f) $100,000 - $150,000 (6)
(g) $150,000 - $200,000 (7)
(h) Over $200,000 (8)
(i) Prefer not to answer (9)

45. How many people are there in your household, including yourself?
(a) 1
(b) 2
(c) 3
(d) 4
(e) 5

(f) 6 or more
(g) Prefer not to answer

46. What is your ZIP code?
(Text response) _____

APPENDIX C

Follow up survey

Introduction

You are invited to participate in a research study to share your experiences and challenges with Aira services. We are conducting this research on behalf of the Connecticut Department of Transportation (CTDOT), the Department of Aging and Disability Services-Bureau of Education and Services for the Blind (BESB), and Aira. CTDOT and BESB are interested in learning about the mobility and independence of individuals with blindness or low vision (BLV) in Connecticut. The results of this survey may be used to guide future efforts to provide resources to assist BLV individuals with safe and secure travel. The results of this survey will also be used to evaluate services provided by Aira. This form includes information about the study, and contact information for the researchers if you have any questions.

Why is this study being done?

We are conducting this study to learn more about the travel patterns and challenges experienced by the BLV community. We are interested in learning about the frequency, purpose, and modes of travel, as well as the challenges experienced while using public transportation, paratransit, etc.

What are the study procedures? What will I be asked to do?

If you agree to take part in this study, you will be asked to complete a confidential survey on the next screen. Survey questions will cover topics related to your level of blindness, travel techniques you utilize, challenges experienced in your personal mobility, use of travel aid devices/services, and demographic information. The survey questions are in multiple-choice and short answer form. To maintain your confidentiality, you should not write anything that would identify you personally in the short answer questions. The survey should take approximately 15 minutes to complete. There are no time restrictions – feel free to take as long as you need to read through this consent form and complete the survey.

What are the risks or inconveniences of the study?

There are no anticipated risks to you for participating in the study. All information you share in this survey will be kept confidential. It will not be associated with any identifying information (name, address, etc.). The only inconvenience is the time required to complete the survey.

What are the benefits of the study?

By participating in this study, the survey results will benefit the state of Connecticut, CTDOT, and BESB through a better understanding of the travel patterns and opinions of the BLV community. The results of this study have the potential to help shape future provisions and resource allocation related to the mobility of the BLV community in Connecticut.

Can I stop participating in the study and what are my rights?
Yes. You do not have to participate this study if you do not want to. If you participate in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate. You are not required to answer any questions that you do not want to.

Who do I contact if I have questions about the study?
We will be happy to answer any questions you have about this study. If you have questions about this study, or if you have a research-related problem, you may contact the principal investigator, Mohammad Razaur Rahman Shaon, Ph.D. (605-690-0810 or mrr.shaon@uconn.edu) and the Co-PI, Niloufar Shirani, Ph.D. (256-797-2244 or niloufar.shirani@uconn.edu).

1. Please indicate your consent to participate in the study:
   (a) I do not consent to participate
   (b) I consent to participate

2. Are you currently a resident of Connecticut?
   (a) No
   (b) Yes

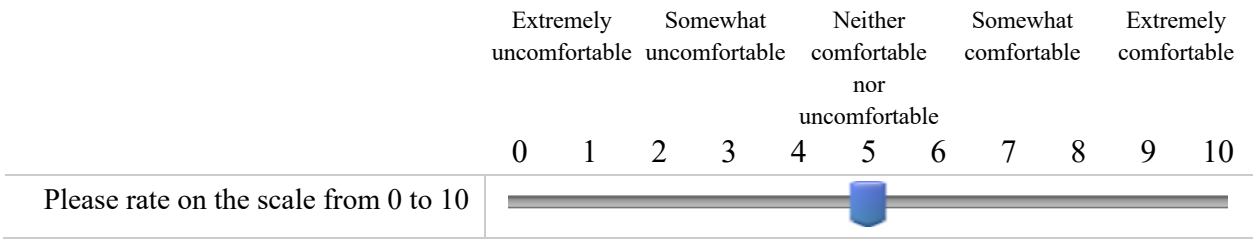
3. What is your level of visual impairment?
   (a) Not visually-impaired
   (b) Mild to moderate visual impairment
   (c) Severe low vision
   (d) Near total blindness
   (e) Total blindness

4. How long have you been visually-impaired?
   (a) Less than 1 year
   (b) 1 to 5 years
   (c) 6 to 10 years
   (d) More than 10 years
   (e) Since birth

5. Which of the following assistive devices do you use? Select all that apply:
   (a) I do not use any assistive device
   (b) Guide dog
   (c) Cane
   (d) Smartphone/tablet apps other than Aira

6. Please rate how comfortable are you in using a smartphone/ tablet on a scale from 0-10, ten being very comfortable.

6. Please rate how comfortable are you in using a smartphone/ tablet on a scale from 0-10, ten being very comfortable.



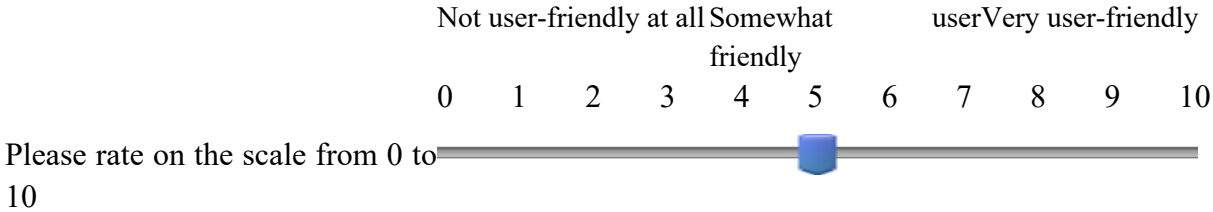
7. How did you learn about Aira?

a) CTRides website
b) Aira website
c) Google search
d) State/Local agency (e.g., BESB, CTDOT)
e) Friends
f) Other (please specify)_____

8. What is your main purpose for using Aira services? Select all applicable answers.
a) Transportation/Navigation
b) Reading documents
c) Online tasks
d) Shopping
e) Other (please specify)_____

Effectiveness of Aira Services

9. In general, how user-friendly would you rate the Aira app from 0-10, ten being very user-friendly?



10. Which of your daily activities do you rely on Aira most frequently? Please write your response below.
Text Response _____

Travel Behavior

11. How often in a typical week do you leave your home?
a) Daily
b) 4-6 times a week
c) 2-3 times a week
d) Once a week
e) Most weeks I do not leave my home

12. How often do you go out alone?
a) Always
b) Sometimes
c) Rarely
d) Never

Public Transportation

13. Please select all forms of public transportation services you use in Connecticut.
a) Bus
b) Train
c) Dia-a-ride
d) I do not use public transportation

14. How helpful was the Aira service in assisting you in using public transportation?
a) Very helpful
b) Somewhat helpful
c) Not helpful
d) I did not use Aira services for using public transportation

15. Would you be encouraged to use public transportation more with assistance from Aira agents?
a) Yes
b) Maybe
c) No

Continued Usage

16. Will you continue to use Aira if you have to pay for this service?
a) Yes
b) Maybe
c) No

17. Will you recommend the Aira service to your visually-impaired friends?
a) Yes, and I already have
b) Yes, but I have not done so yet
c) No
d) Other (please explain the reason)_____

Issues with Aira Services
18. Did you experience any issues while using Aira service?
a) No
b) Yes

19. What was the most frequent issue you experienced with Aira service?
a) Long wait time to speak with an agent
b) Frequent call disconnection
c) Aira agents are not helpful
d) Misinformation from Aira agents
e) Other (please specify)_____

20. In your view, what are the shortcomings of Aira app?
a) Not affordable for me
b) Confusing
c) Not user-friendly
d) Other (please specify)_____

21. What is your gender identity?
a) Male
b) Female
c) Non-binary / third gender
d) Prefer not to answer

22. What is your age?
a) Under 18
b) 18-24
c) 25-34

d) 35-44
e) 45-54
f) 55-64
g) 65 or older

23. What is your racial identity?
a) White
b) Black or African American
c) American Indian or Alaska Native
d) Asian
e) Native Hawaiian or Pacific Islander
f) Other
g) Prefer not to answer

24. Are you Hispanic, Latino, or Spanish origin?
a) Yes
b) No
c) Prefer not to answer

25. What level of education have you completed?
a) 11th grade or lower
b) High school graduate/ GED
c) Some college or vocational school
d) 2-year college degree
e) 4-year college degree
f) Graduate or professional degree
g) Doctorate
h) Prefer not to answer

26. What is your current employment status? Please select all that apply.
a) Employed - Full time
b) Employed - Part time
c) Unemployed - looking for work
d) Unemployed - not looking for work
e) Retired
f) Student
g) Prefer not to answer

27. To the best of your knowledge, what is your total household income?
a) Under $25,000

b) $25,000 - $50,000
c) $50,000 - $75,000
d) $75,000 - $100,000
e) $100,000 - $150,000
f) $150,000 - $200,000
g) Over $200,000
h) Prefer not to answer

28. How many people are there in your household, including yourself?
a) 1
b) 2
c) 3
d) 4
e) 5
f) 6 or more
g) Prefer not to answer

29. What is your ZIP Code?
Text Response_____