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**Exploring the Links Between Transportation Inaccessibility, Social Isolation, and Health Outcomes for People
with Disabilities**

Blake Duarte geyenb@uw.edu

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Abstract

Transportation inaccessibility can have a significant impact on social participation and health outcomes for people with disabilities. My study examined transportation barriers disabled individuals face in their communities accessing social participation and healthcare, and solutions that would enable them to get around easier. I conducted the study through a literature review of past research. Then, I developed and distributed surveys based on my findings. The results showed that there are many challenges disabled people face in accessing services and maintaining an active social life due to a variety of transportation barriers and policies. Much of this is due to the unmet need of adequate transit services in many areas of the United States. The sprawling landscape, road network, lack of sufficient pedestrian and cyclist protection on roadways, and low-density development in most places of the United States has made owning a personal vehicle the easiest way to travel. This makes other transportation options such as transit, biking, walking and rolling challenging or precarious to use and can lead to a negative impact on social connections and mental health among disabled people, many of whom do not drive.

Objectives

My capstone project examined the relationships between transportation inaccessibility, social isolation, and health outcomes for people with disabilities. According to the United States Census Bureau, 45.84 million people in the United States have a disability, comprising of approximately 14 percent of the population (United States Census Bureau, n.d.). Transportation researchers have developed a transportation security index, a tool used to measure transportation insecurity, which is defined as the inability to consistently travel to necessary destinations in a safe and timely manner because of limited transportation options or resources, particularly financial constraints (University of Michigan, 2025). An estimated one in five adults in the United States experience transportation insecurity, according to the Transportation Insecurity Project at the University of Michigan. Dr. Meredith Repke of the University of Montana's Rural Institute for Inclusive Communities, and Dr. Catherine Ipsen (2021) report that social isolation is associated with having few social connections. This can include a limited number of friends or no partner. Loneliness is associated with discontentment of the situation. People who experience social isolation and loneliness can experience more frequent healthcare visits, increased prevalence of depression and cognitive decline, and poor cardiovascular health.

Literature Review

The existing literature suggests that the relationship between transportation inaccessibility, social isolation, and health outcomes among people with disabilities remains understudied. Nevertheless, a growing body of research has begun to shed light on these interconnected factors. Kristen L. Best et al. explains that transportation is vital for people with disabilities in accessing their communities, including "Education, health, employment, and social activities" (Best et al., 2022).

In their study, Dr. Jean P. Hall, Noelle K. Kurth, and Dr. Kelsey S. Goddard found that stronger social connections are associated with improved mental and physical health, and lower mortality rates (Hall et al., 2022). Hall et al., drawing on research from Barclay et al., found that poor health and limited economic resources significantly restricted community access for people with mobility disabilities. Bailie et al., compared nine different qualitative studies on health outcomes of disabled individuals who experienced loneliness in a variety of countries, including two based in the United States. The studies by Emerson E. et al. that Bailie et al. examined were quantitative cross-sectional studies based in the United Kingdom. In their first study published in 2019, they sampled 17,723 individuals between 2016 and 2019. They found that loneliness was related to lower levels of "Satisfaction, worth, happiness, and anxiety for people with" (Bailie, 2023) disabilities. Emerson E. et al.'s second study published in 2021 found a strong correlation between loneliness and worsening health outcomes among people with disabilities.

Accessibility challenges can make it difficult for people with physical disabilities to attend social events. Hall et al. found that people with mobility disabilities often rely on accessible features such as ramps to access homes. Since most residences are inaccessible to people who use wheelchairs, accessing social activities is limited to locations that have ramps and other accessible features. Research indicates that limited social interactions can lead to mental health conditions. A study by Chang Y. et al (2019) found that autistic children and adults in Taiwan aged 10-19 who experienced loneliness and anxiety were strongly correlated. Santino N, et al (2022) found connections "Between loneliness and life satisfaction for people with a spinal cord injury or dysfunction" (Bailie, 2023) in Toronto,

Canada. Studies by Robinson-Whelen et al. and Santino N, et al found a strong correlation between life satisfaction and loneliness for people with a spinal cord injury. Bailie et al. states that from the literature that they found, disabled individuals had poorer health outcomes when they experienced loneliness.

Krista L. Best et al. states that while physical access is important for people with disabilities in accessing their communities, it is only one part of community integration: “Access to primary health care, social and family support, education, and job training” (Best, 2022) also help to ensure that people with disabilities can be integrated in their communities. People with mobility disabilities rely on “Accessible housing and transportation” (Best, 2022) to access their communities.

The literature review and survey responses showed that disabled folks who are unable to drive experience longer travel times than those who don’t identify as disabled. In a University of Michigan report on transportation insecurity in Detroit, some respondents who relied on transit stated they arrived at work early, sometimes up to an hour and a half due to the bus schedules. During a typical workweek, this adds up to seven and a half hours waiting for their shift to start (Wileden and Murphy, 2025). In my research, I found that the need for disabled people to show up early to work, appointments, or events to accommodate transit or family members’ schedules was common among those who do not drive.

Methodology

My study used a thematic analysis approach. Most of the research questions were open-ended and based on themes in the 6 peer-reviewed articles used for my research. I took this approach to allow study participants to share their personal experiences. I created my survey in a Word document format. I used this format to allow users to take their time to complete the survey. Participants were instructed to return their survey to me via email. Survey A (Appendix A), my initial survey, consisted of 19 open-ended questions followed by 7 demographic questions. The initial survey focused on modes of travel, experiences of being unable to go to desired destinations or events, and transportation barriers and challenges faced. Many participants expressed concerns about the survey’s length and repetitiveness. Others chose not to participate due to the length of the survey. Based on this feedback, I reduced the survey to 7 main questions (Appendix B). These questions, Survey B, narrowed my focus to the four themes that I wanted to explore for my study. In survey A, each demographic characteristic was collected through a separate question. Gathering demographic information was important for understanding the representation of minority groups within the sample and identifying populations that may have been underrepresented or missing. In Survey B questions, the demographic questions were combined into a single question. This approach allowed me to collect the same information while reducing the number of questions and making the survey less overwhelming for participants. The questions focused on modes of travel, obstacles faced, how transportation affects their social life and mental well-being, and what infrastructure changes would improve their ability to access their communities. Most participants completed the shorter survey. I organized the results by gathering common themes among answers and looking at the characteristics of the respondent, such as disability, where they live, and what transportation resources they had access to. I found that most participants were unsatisfied with the options that were available to them and additional transportation access could lead to more positive mental health outcomes among disabled people.

Study Recruitment

From January to March 2026, I gathered my data through asking study participants to fill out the surveys. Once someone expressed interest participating in the study, I sent the survey to them in Microsoft Word document format. I used a variety of methods to solicit participants. I used online platforms, including Facebook and LinkedIn. On Facebook I posted a request for participants on my personal profile. I also researched public Facebook groups that would be a good fit to solicit participants for the demographics that I was looking for. I found two public Facebook groups that had members whom I was seeking, DREAM for Postsecondary Students with Disabilities and Our Allies and College Students with DisABILITIES. I posted a request seeking participants on both of their pages. I used a private Facebook group that features different special education resources to seek participants. A special education teacher who I have known for over 20 years agreed to post an invitation to participate in my study on her page. I also used the LinkedIn networking platform. This was a very effective tool in seeking participants from Washington State and throughout the United States. My initial post seeking participants was reposted by 13 individuals, including my capstone advisor, Anna Zivarts, and a professor at the University of Washington whom I have known for many years. I sent the survey to 10 people who expressed interest from my LinkedIn post and 4 completed the

survey. One hurdle that I experienced using LinkedIn was I could only send two free messages per month to people who I was not previously connected with. All interested participants accepted my connection request so that I could send them the survey through LinkedIn's Messaging tool.

I was also invited to give a presentation at Pierce County Accessible Communities Advisory Committee. This opportunity came from the committee's liaison, who saw my LinkedIn post, contacted me and allowed me to briefly present my study and seek participants at their February 6th meeting. Anna Zivarts sent out the survey to her Disability Mobility Initiative email listserv. I announced that I was seeking participants at two Nondrivers Alliance meetings and a Walk/Roll event in January. I was open to participants from any U.S. state to learn about people's transportation experiences in different areas of the country and to maximize my sample size.

Findings

A total of 29 respondents completed the survey, 14 for Survey A and 15 for Survey B. Group A will be noted hereafter for respondents who completed Survey A and Group B for respondents who completed Survey B. Many of the respondents' transportation modes were based on how their disability affected their ability to drive and transportation options available to them in their communities. The most common transportation method participants used among total participants was fixed-route bus (9). Participants from various sizes of regions used fixed route buses, from large cities like Seattle and Sacramento, to small ones such as Port Townsend, Washington and Ontario County, New York. Most participants used fixed route buses out of necessity rather than a choice. Three power wheelchair users who use fixed route buses did not have wheelchair vans, making transit or using a collapsable wheelchair their only transportation options. Neither mentioned a friend or relative who could drive them. Another respondent from Key West, Florida, reported experiencing panic attacks while driving. He no longer drives and described enjoying a car-free lifestyle.

Among transit users, accessible transportation was important to many of them. One law that governs the accessibility of transportation infrastructure in the United States is the Americans with Disabilities Act (ADA). It is a federal law that provides civil rights and public accommodations to disabled individuals. Section II Subtitle B of the ADA requires public transit systems to be accessible to those with disabilities. Section 12142 states that all new or leased vehicles used for a public transportation fixed-route system must be accessible to a person with a disability, including bus and rail vehicles (United States Department of Justice, n.d.). Section 12143 requires transit agencies to provide paratransit services when an individual is unable to access the public service provided, whether it's fixed-route bus, light rail, or another mode of transportation. Six participants indicated that they used paratransit. Some of those who used paratransit had no other options to access their communities. Among paratransit users, only one mentioned that they owned a wheelchair accessible van. Another participant from Spokane County, Washington, mentioned that he needs to use paratransit more than he used to. He recently got a new power wheelchair and the batteries have a limited travel range, increasing his reliance on paratransit.

Seven respondents indicated that they had a wheelchair-accessible van full time. Four said their family member or partner drives them. Three said they used light rail while one used heavy rail. These participants were from large cities that have this type of transportation infrastructure, such as Seattle, Sacramento, and Oakland. Two participants used a bicycle. As Anna Zivarts shared in an article with Bike League, "Many disabled people who cannot drive rely on bikes, trikes, e-bikes, and e-scooters for transportation" (Zivarts, 2024). However, the low number of bike users may have been as a result of the needs and abilities of participants. Approximately half of the respondents had disabilities that would make it challenging to use a bike to access their communities, such as cerebral palsy or chronic illness. There were a few unique transportation modes based on geographical location and infrastructure. A 78 year old man from Port Townsend, Washington, who has limb onset amyotrophic lateral sclerosis (ALS) and a traumatic brain injury (TBI), says he uses fixed route buses, paratransit, Kitsap Fast Ferries, and wheelchair-accessible taxis to get to Seattle for medical appointments. He is unable to afford a wheelchair-accessible van due to the high cost. He also uses Amtrak's long-distance trains to visit his family. I examined transportation modes that study participants indicated they used for different activities, such as medical appointments and socializing with friends. Among all activities, using a fixed-route bus and being driven by a caregiver were the most common responses. The commonality of having a caregiver drive reflects the significant car dependency that we have in the United States and the lack of robust transit services in so many communities.

Table 1: Transportation mode used for family gatherings

Mode	Quantity
Bus	8
Caregiver drives	6
Parent/relative drives	6
Paratransit	4
Light rail	3
Partner drives	2
Wheelchair accessible van with driver	2
Amtrak long distance train	1
Bike	1
Drives self	1
Friend drive	1
Walk	1

Table 2: Transportation mode used for grocery shopping

Mode	Quantity
Bus	11
Caregiver drives	7
Paratransit	4
Family member drives	3
Walk/roll	3
Parent drives	2
Online delivery	2
Partner drives	2
Drives self	1
Light rail	1
Parents do grocery shopping for participant	1

Table 3: Transportation mode used for leisurely shopping

Mode	Quantity
Bus	9
Caregiver drives	6
Paratransit	5
Family member drives	3
Walk	3
Light rail	2
Bike	1
Drives self	1
Online	1
Parent drives	1
Partner drives	1

Table 4: Transportation mode used for medical appointments

Mode	Quantity
Bus	11
Caregiver or known individual drives	7
Paratransit	5
Family member drives	4
Walk/roll	3
Bike	2
Parents drive	2
Drives self	1
Light rail	1
Partner drives	1

Water taxi	1
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Table 5: Transportation mode used for socializing with friends

Mode	Quantity
Bus	11
Caregiver drives	5
Paratransit	4
Family member drives	3
Light rail	3
Bike	2
Partner drives	2
Walks/rolls	2
Drives self	1
Parents drive	1
Water taxi	1

Among participants, eight used power wheelchairs and six used manual wheelchairs. One respondent who used a manual wheelchair did not have an accessible vehicle. He is “lifted out of (his) wheelchair and the chair is broken down for travel.” He experiences anxiety while traveling in the van seat. Wheelchair-accessible vans offer greater mobility for people who use wheelchairs and other specialized equipment because the individual can stay in their devices while traveling. However, they are very expensive due to the vehicle’s reconfiguration for accessibility. After the automobiles are built by the original automaker (eg. Dodge, Chrysler, or Toyota) they are retrofitted by specialized companies, such as BraunAbility, VMI, or Mobility SVM, to make them wheelchair-accessible (BLVD.com Inc, n.d.). This retrofit can add around \$25,000 to the vehicle’s price (AMS Vans, LLC, n.d.), depending on the features of the vehicle. These may include whether the vehicle has a power ramp, in which a motor is used for automatic deployment or a manual ramp in which a person physically pulls out the ramp. The latter option is less expensive because it lacks electronic components, minimizing ramp malfunctions and maintenance. Wheelchair accessible vehicles are commonly used in the United States. According to a report from Fundamental Business Insights and Consulting, a global market research and consulting company in Tracy, California, (Fundamental Business Insights, n.d.) the largest share of the wheelchair accessible vehicle market in 2025 was North America, which reached 43.82 percent of the global share. This was due to robust accessibility requirements for vehicles and a growing senior population (Fundamental Business Insights, 2026). Emerging vehicle technologies and supply chains have helped to meet this demand.



Figure 1: Chrysler Pacifica wheelchair-accessible van with a side entry ramp (The Mobility Resource, 2025)

Among paratransit users, several expressed concerns with the reliability of the service. A 34 year old woman from Seattle who experiences multiple chronic illnesses stated, “Access transportation has been majorly helpful, but they have a tendency of getting me to where I need to go late or I have been stranded places.” She recalled a time when she took paratransit to a 45-minute doctor appointment. She got dropped off at the appointment an hour early. When her appointment ended, her ride home did not arrive at the scheduled time, and she had to wait an extra hour. She stated, “By the time that I had gotten home, my 45-minute appointment turned into a 5.5 hour day. I struggle with energy and chronic pain, so this was a really tough experience.” Another participant from Lakewood, Washington, who uses paratransit said, “I can only go to places where I am not confined to a certain arrival time.” He believes if transportation was easier to access, he may be able to get a job and go to more community activities. Improving the efficiency of paratransit through innovative scheduling software and dispatch may help to improve the reliability of the service.

My research found that there are a variety of obstacles that people with disabilities face in accessing transportation. Costs were the most common barrier. This included the large costs of wheelchair-accessible vehicles, personal vehicles, wheelchairs and vehicle maintenance. Those who identified costs as a barrier were not working, unemployed, or worked for a nonprofit organization. A 57 year old woman specifically mentioned the cost of riding paratransit. She lives in Pierce County, Washington, which is served by Pierce Transit. Currently, she avoids the cost of transit by serving on the Pierce County Developmental Disabilities Advisory Board. Each board member is provided with bus passes on Orca Cards. Transportation costs can be a hardship for people with disabilities, especially those who are on federal assistance. This individual receives less than \$17,000 a year with Social Security Disability Insurance. One ride on Pierce Transit Shuttle paratransit costs \$1.75, 75 percent more than the fixed route fare (Pierce Transit, n.d.). United States Department of Transportation American with Disabilities Act Regulations “Require paratransit fares be comparable to the fare for a trip between the same points on the regular fixed route

system” (United States Department of Transportation, 2015), meaning it could be up to twice the cost of the fixed-route fare. The finding of working for a nonprofit could or could not be conclusive. While many disabled people work for nonprofits, they are not likely to be in leadership roles that earn significant amounts of income. Scheduling was also a significant obstacle that paratransit users faced, including scheduling rides at least 24 hours in advance. USDOT ADA Regulations state that paratransit riders can book trips for the following day. Transit agencies may provide same-day trips, but they are not required to do so. Two participants also mentioned concerns with the cost of ridehailing services, with one needing a wheelchair-accessible vehicle.

My research also found that the weather can significantly impact the travel patterns of disabled people. A total of 12 respondents said the weather impacts their travel patterns. Five respondents indicated that they are impacted by cold weather, followed by four with hot weather, three with snow and two with rain. Those impacted by cold weather included a 28 year old man with asthma. He does not own a car and takes the bus, light rail, and walks to most destinations. A physically disabled 34 year old man who uses a manual wheelchair indicated that his muscles are impacted by cold weather and he typically avoids going out in those conditions. Both are from Seattle, Washington, which typically sees moderate temperatures and rain in the fall and winter. Respondents that were impacted by warm weather included a 32 year old woman with cerebral palsy from Henderson, Nevada. She reported that she avoids traveling during periods of extreme summer heat, particularly when temperatures exceed 100 degrees Fahrenheit.

Many respondents mentioned that the lack of transportation options was a significant obstacle for them, and that it affects their mental health. Major themes included the lack of independence, challenges maintaining a social life and sense of belonging, and difficulties accessing transit, such as broken-down elevators to light rail station platforms. Some respondents stated that the lack of access to transit was a significant barrier in accessing their communities, including reaching destinations that are just beyond the transit network. A 31 year old woman with cerebral palsy said she moved from Seattle to Federal Way and currently has no access to transit. Even though Sound Transit opened their new Federal Way Downtown Station last December (Sound Transit, 2025), she is unable to use it reliability because it’s a 15-minute drive from her home. She states “I hate (to choose what events I ask my parents to drive me to), and it makes me sad because I know that life doesn’t need to be this way. I remember what having independent transportation was like and it’s hard knowing I no longer have that level of independence in my life. It’s depressing, for a lack of a better word.” A 34 year old physically disabled man from West Seattle said that transportation barriers affect his mental and emotional health. He recently stopped driving and is using public transportation more often. When he faces these barriers, he overthinks how to approach the problem and considers what his life would be like if he wasn’t disabled.

Disabled people who rely on transit or others to get around often must make difficult decisions on where to live and consider how it will affect their available transportation options. A 26-year-old man lived at his parents’ home in Puyallup, Washington. He could only roll to a family member’s home that is nearby, as transit service was limited. Stores were too far away from his home to travel to. He felt that his social life was impacted because he is dependent on others to get anywhere. When he completed the survey, he mentioned that he is moving to his own apartment with bus and light rail services nearby. I found other instances where disabled people try to live in areas with good transit service. In *When Driving Is Not An Option: Steering Away from Car Dependency*, Anna Zivarts explains how many disabled people who are unable to drive would like to live in areas with reliable public transportation to improve their mobility and maintain greater independence. In many areas, walkability and the availability of public transportation increase the price of housing. Many nondrivers either cannot afford or have difficulty affording housing that is served by frequent transit, especially light rail. In chapter 2, Anna shares the story of Micah Lusignan. He is unable to drive due to losing his vision as a teenager. He wanted to live in an area with great transit service. He found a shared room in the University District of Seattle. The location offered 3 grocery stores and a gym within a 10-minute walk. However, since rent cost \$700 per month, he spent less than \$1 on each meal. Micah’s story illustrates how critical robust transit services are for many disabled individuals and the lengths they may go to achieve them.

A few respondents indicated that limited span of transit service impacts their lives. A 52 year old blind woman who works in hospitality said nearby transit doesn’t start early enough to get to her 6:30 am work shift on time. Although there is a bus route a block from where she works in Vancouver, Washington, she can’t use it. Instead, she uses another bus route, but the stop is a half-mile from her home, leaving her to walk a further distance. The pathway from the bus stop to her workplace is challenging for her because it “is in a historic area and has some bumpy sidewalks.” She prefers walking along the side of the street so her cane doesn’t get caught on the uneven surface.

1 Due to Washington State’s rainy weather, she had to be at work 20 minutes early to change into her work uniform.
2 Since she is unable to afford to spend \$15 on Uber or Lyft, the only other transportation option she has is her
3 husband. She made an interesting point regarding how her and her husband define gender roles: “My husband is also
4 disabled... He feels like driving me around is part of his job, to do as a man and a husband. I don’t want to take his
5 dignity away by taking the bus.” Another survey participant said that paratransit service near her home in Kent,
6 Washington, only operates from 10 am to 6 pm. She states, “If I want to go anywhere outside of that timeframe, I
7 need family or friends to help me.”
8

9 A 34 year old man described how limited public transportation in West Seattle where he lives has affects him
10 mentally and emotionally. He often takes the water taxi but said the schedule can be limiting: “I wish the water taxi
11 ran later.” He often relies on his parents to get him home due to the limited schedule. The last water taxi departure is
12 at 7 pm, Sundays through Thursdays (King County, n.d.), which would make it challenging to get to events in the
13 evening. He said the nearest bus stop is 2 miles away, making it challenging to roll that far in his wheelchair.
14 According to an article from Yonah Freemark from the Urban Institute, Seattle has 27.5 transit service provided per
15 capita, in miles, making it the 6th highest in the nation (Freemark, 2026). However, there are still coverage and
16 service gaps that make it challenging for disabled people to access their communities
17

18 He does not like asking his parents for rides, although he occasionally needs their assistance with transportation. He
19 has a difficult time when he encounters barriers, such as when elevators in the light rail stations are out of service
20 and he needs to find a new way to get to his destination. In 2020 when I was a Transportation Intern at Rooted in
21 Rights, a program of Disability Rights Washington, myself, Anna, and other disability rights activists met with
22 Sound Transit to find a way to let riders know what elevators are out of service. At the time the Downtown Seattle
23 Transit Tunnel was 30 years old and the original elevators in the stations were often broken down. Sound Transit and
24 King County Metro did not have a policy in place to inform riders of which elevators were out of service. In October
25 2022, the Sound Transit Board voted to take ownership of the Downtown Seattle Transit Tunnel from King County
26 Metro (Lindblom, 2022). At that time, Sound Transit was planning to invest \$96 million to replace escalators and
27 elevators in the tunnel, along with other maintenance. Sound Transit also agreed with disabled transit activists
28 organized by Disability Rights Washington to design stations that do not rely on solely one elevator for accessibility.
29 In most cases, this means having two elevators at stations that require traveling to another floor to reach the train
30 platform. Sound Transit has also developed some unique accessibility designs. While Star Lake Station in Kent has
31 one elevator from the street to the light rail platform, an accessible ramp was incorporated between the two levels
32 (Sound Transit, n.d.). Sound Transit now provides accessibility transit alert information on its website. Riders can
33 also sign up for these alerts to be sent to their phone or email.
34



Beacon Hill

1 Alert



Elevator closure

Ongoing



Beacon Hill Station - Elevator 4 unavailable until further notice due to testing.

In effect: July 30, 2:46 p.m.

Routes: 1 Line

[Copy link](#)

Bellevue Downtown

1 Alert



Elevator closure

Ongoing



Bellevue Downtown Station - Elevator 3 unavailable until further notice due to unscheduled outage.

In effect: Aug. 12, 12:11 p.m.

Routes: 2 Line

[Copy link](#)

Figure 2: Accessibility alerts on Sound Transit's website, showing elevator outages at Link Light Rail stations (Sound Transit, n.d.).

Another theme that emerged from my results was the significant impact of limited bus schedules on individuals' ability to participate in social activities and maintain their health. One participant from Tacoma, Washington, who has a chronic health condition finds it challenging to meet with his friends because of the lack of bus service in the evenings. He feels limited where he can go and when he can meet his friends because he is reliant on transit to get there. He has skipped healthcare appointments due to the limited bus schedule.

He expressed concerns about safety while using transit. He has also experienced "scary situations with people being assaultive and abusive." Transit users who feel threatened or in danger can call or text 911 (South Sound 911, n.d.). Pierce Transit's current five-year contract for security was adjusted at the Board of Commissioners' May 11, 2026, meeting. Security services are provided by Allied Universal Security Services at five transit centers daily from 4 am to midnight (Pierce Transit, 2026). Pierce Transit also has the Hardship Assistance Response Team (HART). An individual or Pierce Transit staff member can request HART for assistance if someone experiences a mental health or other crisis. HART staff can help de-escalate situations and give individuals resources such as where they can go for meals and services. Pierce County Human Services funds the HART Program (Grellier, 2026). Texting 911 may be an easier option for some disabled people, especially if they are unable to speak clearly, are deaf, or hard of hearing, or speaking would threaten their safety (South Sound 911, n.d.). According to a list by the Federal Communications Commission, 49 states except New Mexico have at least one county with text-to-911 capabilities (Federal Communications Commission, 2026). The New Mexico Department of Finance and Administration stated

in July 2025 that text-to-911 will be available soon (New Mexico Department of Finance and Administration, 2025). Sound Transit's security team can be contacted directly by a phone call or text message (Sound Transit, n.d.).

Some study participants reported skipping trips because they were uncomfortable asking others for rides. For example, a 32 year old woman from Sacramento, California, stated that because she could drive only short distances, she sometimes chose to forgo trips rather than ask someone for transportation. She avoids driving on freeways or longer distances. Driving can be overstimulating for her because of the amount of visual information she must process. As a result, she skips a trip at least once a month rather than ask someone for a ride. She described feeling dependent on others. Since she is unable to make some of her desired trips, she experiences sadness and feels detached from her family. She experiences a significant amount of shame because of it and wishes that she could get around independently. She expressed concerns about being unable to get to her husband if he had an emergency. Another study participant who identifies as genderqueer/genderfluid said they like taking transit instead of asking others for rides so they can come and go when they want to. They expressed concerns with people agreeing to give them rides then cancel because they were inebriated from alcohol.

A few participants said that they need extra time to make plans. A 35 year old man from Lacey, Washington, stated "Limited transportation options can reduce spontaneity. While others may be able to decide to meet up at the last minute, I usually need to coordinate logistics well ahead of time. Over time, this can make social relationships harder to maintain." A 27 year old woman who lives in Ontario County, which is a rural part of upstate New York, said "It is incredibly isolating and often depressing as I am naturally a very outgoing person. I sometimes feel like I'm under glorified house arrest because it's so difficult to go anywhere." She has an eye condition associated with physical pain and visual fatigue that prevents her from driving. Besides her mother visiting her once a week, her only interactions with others include remote work, group chats, and FaceTime. She was currently saving money so that she could move to New York City next year: "I have gotten used to using the subway system by myself on visits with friends and family and absolutely love the freedom of movement and independence it gives me." Another respondent stated that since they have moved to an area with improved transit and walking facilities, their mental health has improved. My study found that 22 out of 29 respondents mentioned that their access to transit affects their mental health.

Missing medical appointments due to transportation was an important factor examined in this study. Nearly half of the respondents (14) indicated that they have not missed a medical appointment due to a transportation issue. Four indicated that they build a lot of travel time in their day to ensure that they do not miss their appointments. Three relied on paratransit while four had their family or partner drive them to their appointments. Several said they had missed appointments for a variety of reasons, including inconvenient bus schedules, bus delays, malfunctioning bus ramps, asthma flare ups, and getting relieved late from work. The respondent from Ontario County, New York said she uses the free Medicaid cab program to get to doctor appointments. Besides her mother, this is one of the only transportation options that she has, since she lives in a very rural area and ride sharing is too expensive. She stated that she has missed medical appointments due to needing to schedule trips three days in advance, the cab arriving late, or not showing up at all. This can leave her to cancel appointments at the last minute. A 34 year old woman from Seattle also has missed medical appointments due to transportation. She uses paratransit, Hopelink, a non-emergency medical transportation provider; or her caregiver. One respondent said that he qualifies for "free" Medicaid/Medicare transportation services," to get to his bi-annual medical appointment. However, he rents a wheelchair-accessible van for this trip because it's a more reliable option. He only rents wheelchair-accessible vans on these occasions due to the high cost. Another participant said that during her first time using the bus to get to her doctor's office, she made an error while scheduling her trip on the computer. Even though she arrived three hours late, the clinic understood and still saw her.

Recommendations from Study Participants

Participants in groups A and B were asked to describe changes to transportation services or infrastructure that would improve their ability to participate in their communities. Responses highlighted two primary themes: transit improvements and infrastructure improvements. Among the suggestions to improve transit, answers were typically based on what transportation mode the participants used. For those who used fixed-route buses, there were two separate areas of interest: improved transit service coverage and more frequent transit. A blind participant from Vancouver, Washington, said the transit agency had recently adjusted the bus routes. She expressed concerns that some goods and services are now one to five miles away from the bus stops. She would like to see transit serve more

1 places in Clark County. A woman with cerebral palsy discussed a time when she went to a church event in Seattle.
2 There isn't a bus route that gets her to the church that's "reasonable" and her parents drove her there. However, she
3 could only stay for half of the event because her parents had another event that day in Gig Harbor and she had to go
4 with them because it was her only source of transportation. Her parents ended up being late for their event and since
5 the participant didn't have transportation, it made it hard on everyone. She said, "If I had transportation that I could
6 use independently (like [King County] Metro), I could've gone to my event the whole time and they could've gone
7 to theirs."

8
9 There were five participants from Pierce County who rely on transit services, three of whom used paratransit and
10 two who used fixed route. Those who rode fixed route desired increased frequency, more evening service, and
11 shorter wait times for improved community participation. Two highlighted the desire of better services and
12 infrastructure that benefit people who do not drive. One person from Parkland, Washington, who has a brain injury,
13 asthma, post-traumatic stress disorder, and is immunocompromised, said that they would like to see routes run later,
14 greater bus connectivity to the Lakewood Sounder Station, shorter wait times, and "A general cultural shift that
15 acknowledges disabled people have lives outside of (doctor) appointments." They said it's challenging to go out on
16 evenings and weekends due to the limited bus schedules. Like many transit agencies in Washington State, Pierce
17 Transit's budget is financed through multiple revenue sources, including fares, sales tax, and other operating
18 contributions. Sales tax revenues account for 73.1 percent of the operating budget (Pierce Transit, 2025). Pierce
19 Transit collects 0.6 percent sales tax, meaning 6 cents is collected on every \$10 purchase. The main way bus service
20 can be improved in Washington State is through a sales tax increase. The Pierce Transit Board of Commissioners
21 adopted Resolution 2026-006, putting forth a measure to voters to increase the sales tax to 0.9 percent to preserve
22 and increase transit service. Voters within Pierce Transit's Public Benefit Transportation Area will vote on the
23 measure during the November 3, 2026, general election. The measure would increase transit service by 47 percent
24 (Pierce Transit, 2026). According to the American Public Transportation Association, there has been a growing
25 support to improve funding for transit. In 2025, there were a total of 19 ballot measures that went before voters.
26 Sixteen of them passed, yielding an 84 percent success rate (American Public Transportation Association, 2025).

27
28 The lack of restrooms at transit facilities concerned two respondents from Farmville, North Carolina and Parkland,
29 Washington. The person from Farmville has an acquired physical disability and experiences chronic pain from a
30 bicycle crash. He said he needs to "Consider if there will be any accessible toilets" at each place that he goes
31 throughout the day. He stated: "Bathrooms are often built to the bare minimum of accessibility requirements." He
32 felt that if there isn't a door opener for a restroom, he's forgoing his privacy by asking someone for assistance. He
33 also struggles opening the door on the way out without a door opener. Figure 3 shows a device on some public
34 bathrooms doors where it opens once a button is activated, allowing people who use mobility devices to easily
35 access it.
36



Figure 3: A restroom with a door opener and push button (Limitless Automatics & Doors, n.d.).

One solution is to have transit agencies provide restrooms for their customers, although maintenance and vandalism can be challenging and costly. Pierce Transit started piloting a “Smart, modular restroom at Lakewood Transit Center” (Pierce Transit 2026) in May 2026. King County Metro followed and launched its pilot of Throne restrooms in June 2026 (Switzer, 2026). These restrooms provided by Throne Labs can only be unlocked through a smartphone QR code, app, texting a phone number, or tapping an Orca card. The restricted access feature of Throne bathrooms is designed to help keep users safe and maintain cleanliness. Each unit unlocks after 10 minutes for safety (Throne, 2026). The respondent from Parkland recommended bathrooms for transit riders that are “Clean and safe.”

According to a Sound Transit presentation from 2021, a working group recommended bathrooms at stations with 10,000 boardings or more per day, served by at least 5 routes, and a bus or train trip of at least 20 minutes. The average annual cost per station was \$322,174 (Sound Transit, 2021).



Figure 4: Throne restroom in Pioneer Square, Seattle (Throne, n.d.)

Expanding transit service coverage was recommended by a participant from Sacramento, California. The San Francisco Bay Area Planning and Research Association, SPUR, is a nonprofit public policy organization to research, educate, and advocate for sustainable solutions in the San Francisco Bay Area (San Francisco Planning and Research Association, n.d.). Laura Tolkoff and Sebastian Petty with SPUR state that transit systems in California are funded through “the Local Transportation Fund (LTF), the State Transit Assistance (STA) fund, the Low Carbon Transit Operations Program (LCTOP) program” (Tolkoff and Petty, 2023) and fares. The LTF, STA fund, and LCTOP “are distributed by formulas based on geography and population and, to a lesser extent, on prior-year agency revenues” (Tolkoff and Petty, 2023). Throughout the State of California, “For fiscal year 2020, LTA, STA, and LCTOP funds totaled approximately \$1.8 billion, \$670 million, and \$64 million, respectively, on a statewide basis” (Tolkoff and Petty, 2023). There has been significant decline in ridership on four of the five largest transit systems in California: LA Metro, the San Francisco Municipal Transit Agency (SFMTA), Bay Area Rapid Transit (BART), and AC Transit. This has resulted in significant revenue losses for these transit agencies due to large declines in ridership and fares. One solution is for the transit agency to increase revenues for bus service. California State Senate Bill 63 created the Public Transit Revenue Measure District, allowing a 0.5 percent retail transactions and use tax ordinance for 14 years and a 1 percent tax in the City and County of San Francisco for 14 years if approved by voters in the November 3, 2026, Statewide General Election. This measure would generate \$980 million yearly to help maintain service on “BART, Caltrain, VTA, SamTrans, AC Transit, (and) Muni” (Metropolitan Transit Commission, 2026). While the measure would provide decent bus service if it passes, creating a longer-term source of revenue would be a better solution. Restructuring how the LTA, STA, and LCTOP funds are gathered and distributed to the transit agencies may provide a more stable flow of funding.

Paratransit users offered insightful ways to reform the service. One participant from Kent, Washington, suggested lifting limits on paratransit’s span of service. Paratransit only runs in her neighborhood from 10 am to 6 pm, which limits when she can leave her home and participate in her community. She also wants to see more bus service where she lives. Two recommended the ability to schedule same-day paratransit services. One of the recommenders is from Henderson, Nevada and has cerebral palsy. She occasionally needs to use wheelchair-accessible taxis if she had not

1 previously booked a paratransit ride. However, sometimes, she simply cannot afford the cost. Another participant
2 from Lakewood, Washington, said he would like to see a bus route that serves his neighborhood. He has cerebral
3 palsy and uses a manual wheelchair. Currently the closest bus stop from his home is a mile away and he currently
4 cannot access it. While he uses Pierce Transit's Shuttle paratransit service, he expressed concern with the long travel
5 times, "The Shuttle works because it comes directly to my door, but a lot of time is spent more on travel than the
6 event I'm going to." He felt that the addition of sidewalks in his neighborhood would allow him to go on walks,
7 while a bus route near his home would make it easier for him to participate in his community. A woman with
8 cerebral palsy from Seattle would like to be able to schedule her paratransit trips online. Her speech is affected and
9 the ability to schedule trips either by email or online chat would allow her to schedule her rides independently.

10
11 For those who need support with transportation and live in areas without transit, one solution could be for states to
12 provide a monthly transportation allowance for ridehailing services, such as Uber or Lyft. The allowance amount
13 could depend on the needs of the individual and work status. This would allow disabled individuals in rural areas to
14 access basic services and friendships, depending on their needs. The participant from Ontario County, New York,
15 said since she lives in a remote area, her only transportation options are her mother, friends, or ride hailing. This
16 option could work for her. She recommended using school buses or private buses for transit purposes. The Federal
17 Transit Administration does not allow equipment or facilities that are federally funded to be used solely to provide
18 school bus service (Federal Transit Administration, 2018). New York Public Law § 1502 permit school boards to
19 allow "districts located entirely or partially in any county with less than two hundred thousand population or any
20 town which has a population of less than one hundred fifty persons per square mile residents who are enrolled in
21 education or training programs, including, but not limited to, alternative education programs, vocational,
22 apprenticeship-and job training programs, and on-the-job training; children under the age of five traveling between
23 home and day care or preschool programs; and employees of school districts or other educational or training
24 institutions" (New York State Legislature, n.d.). However, throughout my research, I could not find a specific
25 instance in which this law was being used.

26
27 Understanding where and when to catch the bus is vital for using transit services. A participant from Tacoma who
28 identified as having a learning disability said he would like to see infrastructure that better relays where and when to
29 catch the bus. Many transit agencies use a variety of apps integrated into their service. The Transit app is one that is
30 widely used, with over 180 transit agency partners (Transit, n.d.) It shows bus routes near the rider's location and
31 when the bus will arrive at a nearby stop. It provides transit directions to destinations, giving users a clear way to
32 know what bus routes to take. OneBusAway is another app used in the Puget Sound and five other regions in the
33 United States that provides users with real-time arrival information. Each bus stop is shown on a map, making it
34 simple for the user to find the nearest stops.

35
36 There were also several recommendations for how to improve infrastructure that would make it easier or safer for
37 participants to access their communities. Many of the responses recommended improving sidewalks. This included
38 accessibility, such as curb cuts, continuous sidewalks, and improved parking lot accessibility. A 39 year old man
39 from Seattle who has Duchenne muscular dystrophy said "Downtown is getting better, but in many neighborhoods, I
40 have to drive my (wheelchair) into the street and use garage driveways to get back on the sidewalk because there are
41 no curb ramps." The City of Seattle is currently planning over 80 Safe Streets for All projects that will include new
42 sidewalks and pedestrian ramps. Projects should be completed by 2030 (City of Seattle, n.d.).



Figure 5: A curb ramp with truncated domes at E Valley Street and 24th Avenue E in Seattle (Tupper, 2019)

Participants expressed concerns about the lack of accessible and safe infrastructure for pedestrians. A participant from Oakland, California noted multiple disabilities including a spinal cord injury, epilepsy, and PTSD. He is also a power wheelchair user and said the bumpiness of sidewalks can be “uncomfortable” and “painful,” especially when he gets sores. He often uses bike lanes to travel. He prefers rolling in protected bike lanes. The California Vehicle Code does not exclusively prohibit wheelchair users using bike lanes. CVC 21281.5 acknowledges that wheelchair users may be in the bike lane and does not reference that it is prohibited (California State Legislature, n.d.). In Washington State, the Revised Code of Washington 49.61.250 states wheelchair users can use the side of the roadway if there are no sidewalks available. A participant from Skagit County, Washington expressed concerns about the lack of sidewalks on State Route 20 – a highway that he must walk down for a distance to catch the bus. He finds the route “very unsettling” as a pedestrian.



Figure 6: Blake Duarte rolling down the side of the road in Tacoma, Washington, due to the lack of sidewalks near the Pierce County Election Center (Jill Geyen, 2019).

Another participant from Seattle who has multiple chronic illnesses recommended more public benches, as she needs to often sit. She stated that benches are becoming increasingly less common due to the unhoused population. One solution transit agencies and other municipalities could use to still provide seating are benches with seat delineators. These are separators on the bench that stick up a few inches, preventing people from lying on it.



Figure 7: A bench with delineators, preventing people from lying on it (Tolar Manufacturing, n.d.).

There were also recommendations on how to better protect cyclists from crashes. One participant from Sacramento, California, wanted to see increased enforcement of traffic laws, such as speeding. She specifically recommended automatic speed cameras over police enforcement, and banning turns on red lights. According to the Insurance Institute for Highway Safety, speed safety cameras are effective at reducing spending and minimizing severe crashes. When speed safety cameras were installed in school zones in New York City, the number of crashes decreased by 14 percent during operating hours (Insurance Institute for Highway Safety, 2025). Speed safety cameras are effective on all types of roads. When cameras were installed on neighborhood streets in Maryland and city streets in Washington D.C., there was a 70 percent reduction in drivers traveling over 10 miles per hour over the posted speed limit. According to the report, speed safety cameras are currently used to address speeding in more than 300 communities across 26 states and the District of Columbia. Speed enforcement cameras also have widespread community support, with 62 to 77 percent approval ratings when used effectively.



Figure 8. A speed camera near a school zone in Edmonds, Washington (Vanni, 2023).

The participant, who also is an avid cyclist, expressed concerns with delivery trucks and other vehicles parked in bike lanes. One solution for large cities that the City of Chicago has implemented as part of a pilot program is to use cameras on city-owned vehicles and transit buses to enforce violations of bus and bike lanes. Chicago Transit Authority also uses bus cameras to ticket drivers who are parked at bus stops. Fines for bus lane violators are \$90 while an infraction for parking in a bike lane is \$250 (City of Chicago, n.d.). A bill in the 2022 Washington State Legislature expanded where speed cameras could be installed, “Outside hospitals, parks, along routes where kids walk to school, and at intersections that have a higher-than-average history of crashes” (Packer, 2024). Further safety enhancement for cyclists could include prohibiting no turn on red signals at intersections, according to the participant. Allowing right turns on red signals in the United States was first allowed nationwide in the 1970s as part of states’ energy conservation plans (Office of the Law Revision Counsel of the United States House of Representatives, n.d.) to address the ongoing oil crisis (Day, 2024). Fifty years later, nearly every jurisdiction in the United States allows no turn on red. The main concern with free right turns on red is that while drivers are making the turn, they primarily look to their left to see if they need to yield to oncoming traffic. They often don’t glance to their right to see if a cyclist or pedestrian is trying to cross the intersection, which can lead to near misses and crashes.

My capstone project studied disabled people’s transportation needs and methods, transportation resources available to them, and their ability to participate in their communities. The lack of transportation infrastructure, including transit service, sidewalks, and bike lanes, make it challenging for disabled people to go out and meaningfully participate in their communities. While the annual sources of income gathered was limited to just 11 participants, it’s clear that many disabled individuals are low-income. Six made less than \$40,000 per year. From this, while the sample is very small, it is inferred that many disabled individuals live either with their parents or family member for reduced housing cost or live at a place that they can afford. While this study did not examine if the participants had a choice or say in whether nearby transportation resources was a factor in where they currently live, it’s clear that

more transportation services in their communities could foster additional participation and possibly reduce negative impacts on their mental health.

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Appendix A: Survey A Questions

1. What is your name?
2. Do you identify as having a disability? If so, you may describe the type(s) of disability you experience.
3. What city and/or county do you live in?
4. Can you describe your transportation needs and how you typically get around your community? About how often do you leave your home in a typical week? Are there times of day, seasons, or weather conditions that affect how you travel? If so, what are they?
5. Are there ways of getting around (such as transit or a ride from a friend or family member) you prefer or avoid? Why?
6. Can you describe a recent trip that was easy or difficult for you? What made it easy or difficult, and how did you feel at the time?
7. For the following activities, what mode(s) of transportation do you typically use: work, school, grocery shopping, leisure shopping, medical appointments, family gatherings, socializing with friends? Are there particular times of day or types of trips that are especially difficult? If yes, can you elaborate?
8. What transportation barriers do you face, if any? These could include things like cost, safety, physical access, scheduling, or unreliable service.
9. Do you feel you can get to the places you need or want to go in your community? Why or why not?
10. Are there parts of your community you can access more easily than others? Please describe.
11. How do transportation challenges affect your ability to spend time with friends, family, or participate in social activities?
12. Do transportation barriers affect your sense of belonging or connection to your broader community? If so, how?
13. Does transportation affect your physical health, mental or emotional well-being, or your ability to take care of ongoing health needs? If so, how?
14. Are there sidewalks or other pedestrian infrastructure in your neighborhood (such as marked crossings, lighting, or other safety features)? If so, please describe.

1 15. Do you feel safe walking or rolling in your neighborhood? Why or why not? You may consider safety from
2 traffic (such as vehicle speed or volume) or personal safety (harassment, lack of lighting).

3
4
5 16. How dependable is your transportation? For example, are there delays, cancellations, or uncertainty that
6 affect your plans? How do you work around that uncertainty?

7
8
9 17. Has there been a time when you missed a medical appointment or delayed medical care because of a
10 transportation barrier? If so, describe what happened in relation to the transportation barrier.

11
12
13 18. Has there been a time when you didn't take a trip because you didn't want to ask someone for a ride? How
14 did that make you feel? Did it affect your sense of independence or social connection? How often does this happen?

15
16
17 19. What changes to transportation services or infrastructure would most improve your ability to participate in
18 your community?

19
20
21 20. What activities would you like to participate in more if transportation were easier?

22
23
24 Next, I'd like to ask a few demographic questions to better understand how transportation experiences vary across
25 different communities. You may skip any question you prefer not to answer.

26
27 21. What is your living situation? (Live alone, with others, or family, house, apartment, adult family home)

28
29
30 22. Are you employed? If so, what kind of work do you do? How do you get to your job?

31
32
33 23. If you're comfortable sharing, approximately how much do you earn in a year? What are your main sources
34 of income (such as work, Social Security SSI or SSDI)?

35
36
37 24. What is your age?

38
39
40 25. What is your gender identity?

41
42
43 26. What is your race/ethnicity?

44
45
46 27. What is your highest level of education?

47
48
49 28. Is there anything else you would like to share about your transportation experiences or how they affect your
50 life?

Appendix B: Survey B Questions

1. How do you typically get around your community? (List modes: bus, car, walking/rolling)?
2. What are the primary obstacles you face (eg. Cost, physical access, reliability, or safety)?
3. Has transportation ever affected your health or access to medical care? (For example, missing or delaying appointments.) If so, please describe.
4. How does transportation affect your social life and mental wellbeing?
5. Can you describe a recent trip that was either easy or difficult for you? What made it that way?
6. What specific changes to infrastructure (eg. More curb cuts, more frequent transit) would most improve your ability to participate in your community?
7. What city or county do you live in?
8. Optional demographics (you may skip any):
Age; gender identity; race/ethnicity; disability; employment status; approximate annual income; living situation; highest level of education.