Transportation Research Interdisciplinary Perspectives 8 (2020) 100263

Contents lists available at ScienceDirect

Transportation Research Interdisciplinary Perspectives

journal homepage: www.elsevier.com/locate/trip

# Impacts of COVID-19 on access to transportation for people with disabilities

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ARTICLE INFO

*Keywords:*
COVID-19
Pandemic response
Disability
Travel behavior
Health
Interviews

ABSTRACT

People with disabilities may be particularly vulnerable to the direct health effects of the COVID-19 pandemic as well as the wider impacts of the pandemic response. People with disabilities experience numerous barriers to using transportation to access essential goods, like fresh food, and services, like medical care, that are necessary for maintaining health. The pandemic and the pandemic response threaten to exacerbate persistent health disparities and add to transportation barriers that disadvantage people with disabilities. To better understand difficulties that individuals with disabilities are facing using transportation and meeting their needs during the pandemic, I conducted in-depth interviews with 21 San Francisco Bay Area residents with disabilities between March 20 and April 6, 2020, immediately following adoption of the first shelter-in-place orders in the region. Analyzing these interviews, I find that the pandemic is aggravating many difficulties accessing transportation and other essentials that people with disabilities regularly encounter. These include challenges accessing reliable and safe transportation as well as up-to-date communications about transportation and public health, and difficulties getting needed assistance using transportation and completing activities of daily living ranging from personal care to getting groceries. I recommend that those involved in the pandemic response make a concerted and intentional effort to address barriers to accessing needed transportation, communications, and assistance that people with disabilities are facing during the pandemic, paving the way for a more inclusive pandemic response.

## 1. Introduction

As many as 1 in 4 American adults report having a disability (Okoro, 2018). There are a number of reasons why people with disabilities may be at higher risk during the pandemic; some are related to the direct health effects of the pandemic and others to consequences of the pandemic response (Boyle et al., 2020; Douglas et al., 2020; Turk and McDermott, 2020). These risks threaten to aggravate existing health disparities that disproportionately disadvantage those with disabilities (Krahn et al., 2015). In this article, I investigate if and how transportation challenges pose harm to individuals with disabilities during the pandemic by preventing them from accessing essential goods and services necessary for maintaining health.

Problems preventing, diagnosing, and treating COVID-19 among people with disabilities increase their vulnerability to the direct health effects of the pandemic. Circumstances associated with disability, including older age, having underlying health problems, experiencing poverty, belonging to minority racial and ethnic groups, and rural living, make this group more vulnerable to adverse health outcomes (Krahn et al., 2015; NCD, 2009a). Presently, such outcomes include infection with the severe acute respiratory syndrome coronavirus (SARS-CoV-2) and illness from COVID-19. Some people may be at greater risk because of the nature of their disability. For instance, individuals with intellectual disability may find it challenging to understand and perform routine measures to prevent becoming infected with or spreading the virus such as handwashing, physical distancing from others, or self-isolating (Courtenay and Perera, 2020). Other people may not be able to physically distance given their personal care needs (Boyle et al., 2020). Difficulties diagnosing COVID-19 have been reported among people with disability due to spinal cord injury because of screening and triage challenges (Korupolu et al., 2020). Such difficulties can delay diagnosis and care for individuals with disabilities who have contracted COVID-19, posing harm to them and allowing additional time for the virus to spread to others.

People with disabilities are also at greater risk of experiencing negative consequences of pandemic response measures, which may impact their health. These can result from disruption of their support services and of essential services generally, including transportation (Douglas et al., 2020). People with disabilities—particularly individuals without reliable access to a household vehicle and/or who cannot drive—often

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https://doi.org/10.1016/j.trip.2020.100263
Received 1 September 2020; Revised 16 November 2020; Accepted 18 November 2020

need to rely on other people for help using transportation. This may be as simple as assistance with driving (i.e., asking for or hiring a ride) to as involved as help transferring into/out of a vehicle or securing a wheelchair. Asking for any form of assistance during the pandemic may be dangerous for travelers with disabilities as well as for those providing assistance, since they require relatively close contact. Using transportation is only one part of daily living; people with disabilities may also require assistance with other essential tasks. Some people with disabilities need help shopping because of their disability, for instance, if they cannot pick out or reach specific products. Other people with disabilities require assistance with personal care tasks, like bathing. Assistance may be provided by informal caregivers, including friends or family members, or formal caregivers such as hired attendants.

Though people with disabilities may require more care and support than others, people with disabilities have been shown to have smaller social networks than people without disabilities (Lippold and Burns, 2009). This may compromise their ability to get assistance during and after emergencies (Stough et al., 2017). Being relatively socially isolated and having a disability may also prevent some individuals from accessing important communications during emergency scenarios, including those related to transportation and public health (Matherly and Mobley, 2011). Without access to this information, such individuals may not be able to make informed decisions about traveling and otherwise acting safely, putting them at risk.

In this research, I analyzed in-depth interviews conducted with people with disabilities living in the San Francisco Bay Area to investigate how these individuals were meeting their needs during the COVID-19 pandemic. I found that respondents had more difficulty than usual accessing transportation during the pandemic, and had to rely to a greater extent on caregivers and delivery services to get groceries and medications. Difficulties were especially pronounced among respondents who did not have reliable access to a household vehicle and someone who could drive it. Barriers to accessing transportation as well as other essential goods and services included concerns about health and safety; a lack of awareness of available options (i.e., what transportation services were running); a lack of access to up-to-date transportation and public health communications; and issues getting needed assistance using transportation and shopping. Issues accessing transportation, getting groceries and medications, and concerns about obtaining medical care all posed health risks. Findings of this study shed light on issues with the pandemic response that are likely to exacerbate existing health disparities between people with and without disabilities. They also demonstrate some ways that people with disabilities have found to cope during the pandemic, thus revealing both problem and opportunity areas for those involved in the pandemic response to intervene. I make recommendations for how planners can use this information to reconsider pandemic response strategies and mitigate adverse health consequences for people with disabilities.

## 2. Background

### 2.1. Transit and paratransit during the pandemic

The pandemic response has been devastating to the nation's public transportation systems, which are grappling with how to continue providing safe service in the face of unprecedented budget constraints (Badger, 2020). Fare revenue for most systems has been severely diminished by low ridership. Other funding streams for public transportation, including sales taxes, payroll taxes, parking fees, tolls, etc., are dwindling because of low household spending, high unemployment, and low levels of travel. Agencies have been forced to cut services most everywhere, eliminating routes and limiting hours of operation among other actions, including in the transit-rich Bay Area. While some of these services are being restored as cities relax travel and activity restrictions and employees and riders return (Prado, 2020), transit agencies are not yet operating services at pre-pandemic levels (Castillo, 2020).

Though paratransit services, which must be provided for riders with disabilities who cannot use fixed-route services according to the 1990 Americans with Disabilities Act (ADA), have experienced changes as a result of the pandemic, most agencies have not cut paratransit service even where fixed-route services are not operating. Transit agencies have implemented measures to minimize risk of virus transmission on transit and paratransit services that are still running. These include infrastructural interventions, for instance, installation of in-vehicle barriers between riders and drivers, as well as operational changes, like asking passengers to board buses using the rear doors and to pay using contactless systems. Additionally, transit agencies have changed operations, capping vehicle capacities, for example, to reduce crowding on board and allow for safe distances between drivers and passengers. Paratransit services, which typically provide shared rides in ADA accessible vans, have limited the number of passengers they will transport per trip (McDonough, 2020). Additionally, many paratransit programs have limited rides to essential trips, or destinations such as grocery stores, pharmacies, and medical facilities (Weiner and Armenta, 2020). Many paratransit and transit operators, concerned about the possibility of virus transmission during fare payment, eliminated fares for fixed-route and paratransit services in the early months of the pandemic response. Some, but not all, have since returned to charging fares.

More than 20 operators provide transit services in the Bay Area. Everywhere these services operate, paratransit is also available for eligible riders. As of November 2020, a few paratransit operators in the Bay Area were offering significantly modified services in response to the pandemic and local travel restrictions. For instance, fares were suspended and rides were only being provided to those receiving dialysis and chemotherapy treatments on DART paratransit, which complements Fairfield and Suisun Transit (FAST). Most paratransit services in the region, however, were operating normal service with small changes, like asking riders to wear face coverings.

### 2.2. The travel behavior of people with disabilities and social exclusion

Traveling during the COVID-19 pandemic may be particularly challenging for people with disabilities who use personal vehicles less and rely on public and shared transportation services more than the rest of the U.S. population (Brumbaugh, 2018; U.S. Department of Transportation, 2003). Using data from the 2017 U.S. National Household Travel Survey, Henly and Brucker (2019) found that having a disability was associated with lower odds of taking trips for shopping and running errands, socializing, or for going to work when controlling for other sociodemographic characteristics. Transportation problems have been shown in other studies to keep people with disabilities from finding and keeping employment (e.g., Loprest and Maag, 2001), and participating in social and community activities (Bascom and Christensen, 2017; Bezyak et al., 2019)

Limited transportation puts people with disabilities at increased risk for experiencing social exclusion, defined as "circumstances where individuals or groups of people are unable to participate in activities or to access goods, services, and opportunities that are available to others as a fundamental part of belonging to society" (Mackett and Thoreau, 2015, p. 3). People with disabilities often express a desire to travel more than they do, particularly to participate in leisure, recreation, and social activities (Mattson et al., 2010; Páez and Farber, 2012; U.S. Department of Transportation, 2003). Social exclusion can contribute to feelings of perceived isolation, which are associated with poor physical and mental health outcomes (Repke and Ipsen, 2020). The COVID-19 pandemic has put increased attention on problems of loneliness and social isolation, particularly among already isolated

groups including older adults and people with disabilities (Berg-Weger and Morley, 2020).

### 2.3. COVID-19, disability, transportation barriers, and health disparities

While disability, in itself, is not intrinsically linked to risk of becoming infected with the coronavirus and contracting COVID-19, there are a number of reasons why people with disabilities may be at higher risk during the pandemic (Boyle et al., 2020). People with disabilities are generally in poorer heath and at greater risk of experiencing adverse health outcomes than the rest of the U.S. population (Krahn et al., 2015; NCD, 2009a). Death and severe illness from COVID-19 are more likely to occur among people with underlying health conditions (CDC, 2020). Prevalence of disability is higher among those over age 65, as well as among people living in poverty and members of minority racial and ethnic groups (Okoro, 2018). People over age 65 are more prone to severe illness from COVID-19, and Latino and African-American residents of the U.S. in all age groups are more likely than white residents to be infected with the coronavirus and to die from COVID-19 (Oppel Jr. et al., 2020). COVID-19 incidence is rising in rural areas where a high proportion of people with disabilities live (Paul et al., 2020), which is likely to increase their risk of becoming infected.

In the first published study examining the relationship between COVID-19 cases and disability characteristics in the U.S., Chakraborty (2020) found that people with disabilities who belong to racial and ethnic minority groups, are experiencing poverty, aged 5–17 years, and female were overrepresented in counties with higher COVID-19 incidence. This highlights the importance of examining the impacts of the pandemic on people with disabilities generally, as well as giving specific attention to sub-groups that may be particularly vulnerable.

Examining data from the National Health Interview Survey, Wolfe et al. (2020) found that transportation barriers to health care, which may result in delayed care or missed appointments, disproportionately impact individuals with disabilities. Others have found that while people with disabilities use health care at a much higher rate than people without disabilities, they also encounter many transportation-related barriers to accessing medical care and are generally more likely than people without disabilities to have inadequate transportation, a recognized social determinant of health (Brucker and Rollins, 2016; Drainoni et al., 2006; Krahn et al., 2015; NCD, 2009a). During the pandemic, these transportation barriers might add to problems diagnosing and treating COVID-19 in patients with disabilities. Transportation barriers might also discourage individuals with disabilities from maintaining their health by seeking normal preventative and non-urgent care, thereby exacerbating existing health disparities. The rurality of disability in the U.S. may intensify difficulties getting medical care among this population, as people with disabilities living in rural areas face more transportation and access-related challenges than their urban counterparts (Iezzoni et al., 2006).

### 2.4. Communicating with people with disabilities during emergencies

It is critically important that those involved in emergency planning and response are able to effectively communicate with vulnerable populations, including people with disabilities and those with special health-care needs, in times of crisis (Nick et al., 2009). Inaccessible communications have proved problematic in the past for alerting people with disabilities to emergencies and keeping them informed during response periods (Waterstone and Stein, 2006). These issues have been especially pronounced for people who are deaf or hard of hearing and require an interpreter and/or closed captioning, and people who are blind or have low vision and cannot easily read print or otherwise readily access visual information (NCD, 2009b; Waterstone and Stein, 2006). As web-based platforms are utilized more for disseminating emergency communications, new accessibility issues have arisen, keeping those who are unable to access or use devices and software required to receive these communications from being properly informed (Bricout and Baker, 2010; Wentz et al., 2014).

Matherly and Mobley (2011) identified gaps in communicating about transportation with vulnerable populations, including people with disabilities, in emergency scenarios. They found that many gaps stemmed from a lack of coordinating emergency preparedness, response, and recovery at the local level, where community stakeholders know and understand diverse communities of vulnerable populations in their area. Transportation agencies must be a part of this local effort, and work with existing networks of social service agencies, community-based organizations, faith-based organizations, and non-governmental organizations to reach and effectively communicate with vulnerable populations (Matherly and Mobley, 2011). The authors offered specific strategies and tools for overcoming communication barriers, including a lack of access to or understanding of mainstream media and/or the internet, such as making translation and interpreter services available, disseminating information in a variety of formats and adapted for target audiences, using simple messages, and communicating through alternative as well as mainstream media outlets.

Communicating with people with disabilities may be uniquely difficult during the COVID-19 pandemic given the nature of the emergency and evolving response. Armitage and Nellums (2020) identified three key barriers to including people with disabilities in the pandemic response: (1) inequities in access to public health messaging; (2) measures such as physical distancing and self-isolation potentially disrupting service provision for people who rely on assistance for delivery of food, medication, and personal care; and (3) disproportionate risk of severe disease resulting from coronavirus infection, and issues accessing health care during the pandemic. To address these barriers and avoid widening existing health and risk disparities, these authors called on planners to consider the needs of people with disabilities in their COVID-19 mitigation strategies, and to include individuals with disabilities in planning processes.

In this research, I build on Armitage and Nellums' work by examining how barriers that they identified and others are actually affecting individuals with disabilities during the pandemic. Data from interviews reveal how barriers impacted people differently based on personal characteristics, such as primary disability type, as well as based on factors like household vehicle access. Results highlight the need for researchers and planners to recognize people with disabilities as a heterogeneous population, conduct intra-categorical analyses (e.g., Chakraborty, 2020), and tailor interventions for members of this population accordingly.

## 3. Research design and methods

### 3.1. Sampling and interview data collection

Study respondents had previously participated in interviews for related research in the fall of 2019. All were over age 18, self-identified as having a disability, and lived in the San Francisco Bay Area. I recruited respondents for initial interviews using a combination of purposive and snowball sampling techniques. Specifically, I worked with two local organizations that serve people with disabilities, Light-House for the Blind and Visually Impaired and The Center for Independent Living, to distribute a call for research participants. Individuals who were potentially interested in participating then contacted me, and, if they consented to participate, we scheduled an in-person interview. All initial interviews were conducted in September and October 2019.

After I made contact with potential respondents regarding this follow-up study and they consented to participate, we scheduled a

phone interview. Phone interviews were conducted between March 20 and April 6, immediately after adoption of the first shelter-in-place orders in the Bay Area on March 16, 2020 (Allday, 2020). I used an interview protocol (see Appendix A) approved by the Institutional Review Board at the University of California, Berkeley, to structure the conversation during follow-up interviews. All interviews were audio recorded with respondents' permission. Interviews ranged from approximately 15 to 55 min in length.

The sampling strategy employed in this research was not intended to produce a representative sample. The study sample did capture a relatively diverse group of adults with disabilities in terms of the distribution of certain sociodemographic characteristics, including age, gender, and primary disability type. Detailed information about respondents is included in Table 1. Respondents' median age was 66 years. 8 respondents reported their gender as female; 13 reported their gender as male. Most respondents reported being blind or having low vision as their primary disability type. Almost all respondents reported using some kind of mobility aid when they traveled. 10 respondents were employed either full- or part-time; 11 were not employed. All but one of the respondents were nondriving, though some had been drivers in the past. Two-thirds of respondents (14) had access to a household vehicle, while one-third (7) did not.

### 3.2. Methodology for analyzing interviews

All 21 interviews conducted for this study were audio recorded and transcribed verbatim. I analyzed the interview transcripts using a modified version of Deterding and Waters' (2018) "flexible coding" approach. This method combines inductive, or data-based, with deductive, literature- and theory-based, strategies for identifying important concepts and themes in interview data. Deterding and Waters suggest flexible coding as an appropriate set of procedures for analyzing large amounts of in-depth interview data solo or in teams, using modern tools like qualitative data analysis (QDA) technology. To code interviews for this research, I built off of the coding scheme developed previously to analyze interviews conducted with respondents in the fall of 2019. Many of the codes remained applicable to follow-up interviews, particularly attributes—codes representing high-level data descriptors that guided the research design such as "Disability type" and "[Respondent] Age." Attributes are the top level of a hierarchical, phased coding scheme used in the flexible coding approach. Index codes—codes marking answers to questions in the interview protocol—were applied to the data after attributes. For instance, answers to the question, "What kinds of unique challenges do you think people with disabilities are facing regarding transportation and travel in wake of the COVID-19 outbreak?" were coded with, "Index COVID Challenges." Finally, analytic codes were assigned to the transcripts. These represented fine-grained concepts that were particularly useful for understanding key themes in the data (e.g., "Assistance"). I coded all transcripts in Dedoose, a web application developed to facilitate team-based, mixed methods research.

To explore if and how people with disabilities were using transportation and meeting their needs during the pandemic, I analyzed the occurrence and co-occurrence of codes. For instance, to identify difficulties that respondents and other people with disabilities were facing using transportation and accessing the essentials, I could examine all excerpts assigned the index code, "Index COVID Challenges." To better understand these challenges, for example, by investigating whether they were arising from respondents' use of particular services, I could look at excerpts in which "Index COVID Challenges" co-occurred with codes such as "Bus" or "Paratransit." If I wanted to analyze how these challenges were related to feelings of dependence among respondents, for example, I could look at instances where "Dependence" co-occurred with "Index COVID Challenges." Fig. 1 illustrates the coding process using an example transcript and excerpts.

## 4. Findings

I organize findings by describing barriers and facilitators to people with disabilities meeting their needs during the pandemic in three areas that deserve special attention from those involved in the pandemic response: transportation, communications, and assistance.

### 4.1. Transportation issues

#### 4.1.1. Health and safety concerns posed barriers to using public and shared services

When asked what was challenging about using transportation during the pandemic, a man in his fifties who is blind reported that a "lack of transportation options" and "reluctance to use them" [R13] were keeping him from doing things that he would normally do readily, like using app-based ridehailing (e.g., Uber/Lyft) to travel to get groceries or go to a medical appointment. He and other respondents worried about being infected with the virus by coming in close contact with

**Table 1**
Detailed demographics of interview respondents (N = 21).

| Respondent ID | Age | Gender | Disability type | Mobility aid | Employment status | Household vehicle |
|---|---|---|---|---|---|---|
| R01 | 29 | Female | Blind or Low vision | Dog assistance | Employed part-time | Yes |
| R02 | 72 | Female | Blind or Low vision | White cane | Not employed | No |
| R03 | 35 | Male | Blind or Low vision | White cane | Employed part-time | Yes |
| R04 | 51 | Female | Blind or Low vision | Dog assistance | Employed full-time | Yes |
| R05 | 47 | Male | Blind or Low vision | White cane | Employed full-time | Yes |
| R06 | 75 | Male | Blind or Low vision | White cane | Not employed | Yes |
| R07 | 73 | Male | Blind or Low vision | White cane | Not employed | No |
| R08 | 64 | Female | Blind or Low vision | White cane | Not employed | Yes |
| R09 | 94 | Female | Blind or Low vision | Support cane | Not employed | Yes |
| R10 | 66 | Female | Blind or Low vision | Dog assistance | Employed part-time | No |
| R11 | 69 | Male | Blind or Low vision | White cane | Not employed | Yes |
| R12 | 78 | Male | Blind or Low vision | White cane | Not employed | No |
| R13 | 51 | Male | Blind or Low vision | White cane | Employed full-time | No |
| R14 | 72 | Male | Deaf/Hard of hearing | Support cane | Not employed | No |
| R15 | 47 | Female | Mobility disability | Motorized wheelchair | Employed full-time | Yes |
| R16 | 79 | Male | Mobility disability | Walker | Not employed | Yes |
| R17 | 86 | Male | Multiple disabilities | Walker | Employed part-time | Yes |
| R18 | 53 | Male | Multiple disabilities | Dog assistance | Employed full-time | No |
| R19 | 59 | Female | Multiple disabilities | Manual wheelchair | Not employed | Yes |
| R20 | 32 | Male | Multiple disabilities | Motorized wheelchair | Employed part-time | Yes |
| R21 | 74 | Male | Chronic illness | None | Not employed | Yes |

people in transit, including drivers and passengers. Several also worried about the cleanliness of transportation facilities and vehicles, for they were afraid that the virus could be transmitted via surfaces. This was particularly troubling for respondents who are blind or have low vision and rely heavily on touch for navigating and using transportation. A woman in her twenties who is blind explained that without sight, "You have to touch something in order to know what it is or where it is" [R01]. She feared that touching door handles, handrails, ticket machines, and other surfaces that she usually does while taking transit or using ridehailing would put her at risk.

A man in his seventies who is blind summarized a number of concerns echoed by other respondents who did not have access to a household vehicle and driver,

> "I think that all the problems that everyone are having are probably magnified somewhat with disability, because, I mean, if I really had to go someplace right now, and I didn't want to use Lyft or Uber, and I'm a little nervous about the bus and BART—I'm stuck. Now, even to the extent that if I didn't feel well and thought I needed to go to the doctor, Boy, I'd have to take my chances and probably go with a ride[hailing] service and hope that I'd get one! And it would be tricky because … if I were ill, I'm getting in somebody's car and I'm ill … and they might be ill! I think the disability piece makes that harder. For instance, a lot of my friends are not going to hop on their bike, or they don't have a car. And if they're not using public transit … there aren't that many alternatives." [R07]

Other respondents who were regular transit users were disturbed by some of the pandemic response strategies that were simply not accommodating of particular riders with disabilities. A woman in her forties who uses a motorized wheelchair explained that she has a "hesitation" to use transit that she does not normally have because of concerns about the pandemic and response strategies. She explained,

> "One of the things about the way that transit is responding [to the pandemic] is the move to rear-door boarding, to help people stay distanced and separate. And, the fact is, for somebody like me [using a motorized wheelchair] on a bus or for anybody using paratransit, you can't be distanced from the driver; it's just not an option." [R15]

Because using a bus or paratransit meant needing to enter through doors with ramps (typically front doors) and requiring a driver to be in close contact to secure her motorized wheelchair, this respondent felt that her and other people who require such accommodations were at an increased risk using these services.

#### *4.1.2. Respondents encountered additional transportation barriers to seeking medical care*

Several respondents felt they would be exposing themself to risk of infection using any public or shared service. This caused some respondents to severely limit their use of transportation and abandon

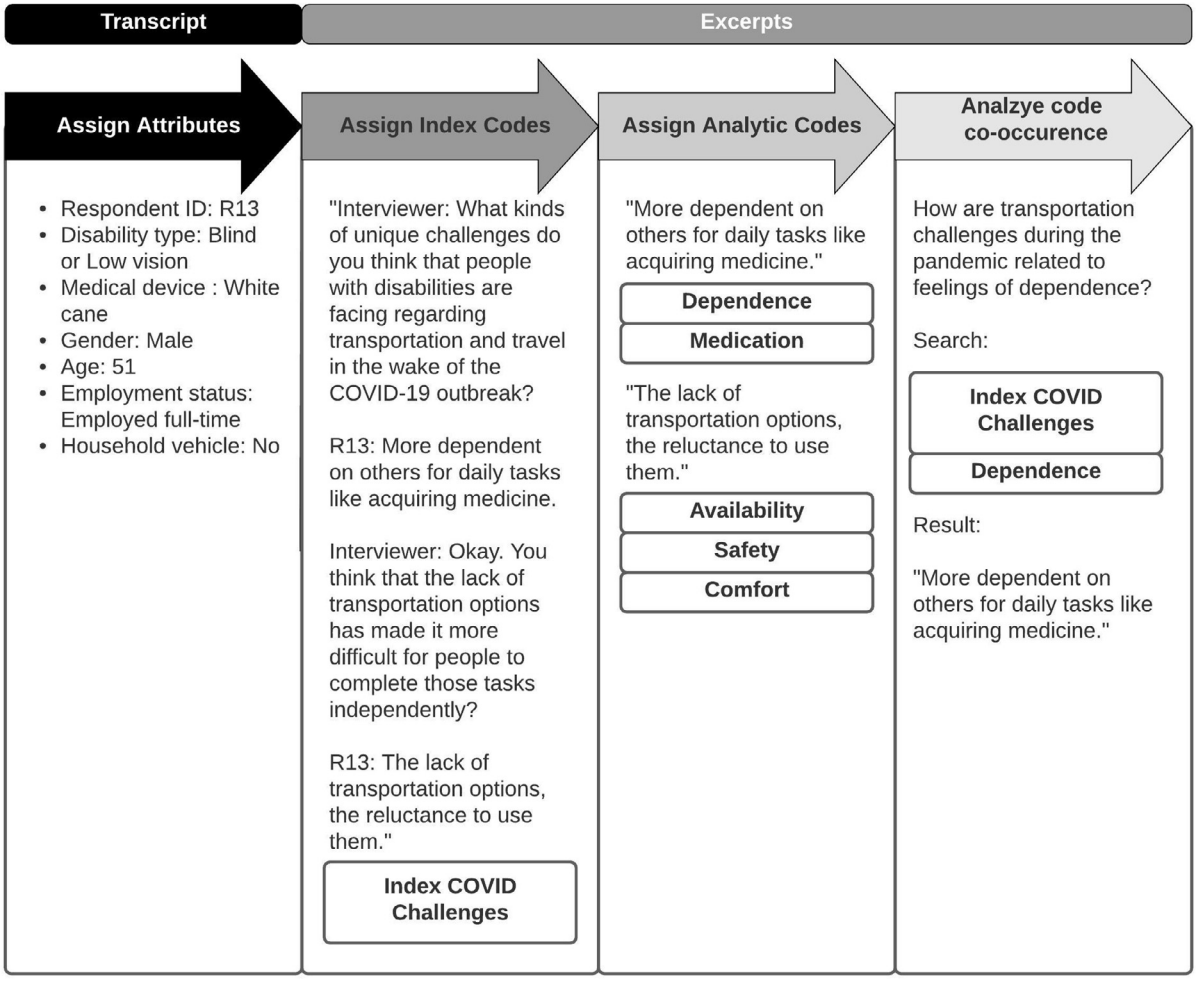


**Fig. 1.** Diagram illustrating the coding process employed in this research. Index and analytic codes are bolded and enclosed in rectangular borders. Adjacent codes are co-occurring, or assigned to the same excerpt.

particular activities, including going to the doctor. In a previous interview conducted during the fall of 2019, a woman in her fifties with multiple disabilities reported that she was not driving because of her disabilities. At that time, she was using transit, paratransit, and occasionally ridehailing services to get around. During our follow-up interview in March 2020, she reported that she had regained the ability to drive and had been using her personal vehicle for most trips within 5 miles of her home. Since the beginning of the pandemic, she had only left the house to go to a few nearby doctor's appointments. Had she not been driving, she said,

> "I would not have probably gone because I would not have wanted to expose myself to whatever the environment was in whatever mode of public transportation I took, whether that would have been paratransit or a bus or BART. It's not worth the risk." [R19]

Transportation barriers are known to keep people with disabilities from accessing health care (see Section 2.3). Concerns about becoming infected with the coronavirus while using public and shared transportation services added to these barriers for some respondents. Some transit and paratransit services have changed their operations to try to reduce barriers during the pandemic, for instance by eliminating fares and adopting more intensive vehicle cleaning and disinfecting procedures. For respondents in this study, these changes were not enough to overcome added barriers, suggesting the pandemic may exacerbate health disparities by making it risker and/or more difficult for people with disabilities to seek medical care. It further indicates that nondriving people with disabilities who do not have access to a household vehicle and rely predominantly on public transportation deserve special attention, for they may be at greater risk of delaying or forgoing care.

#### *4.1.3. Respondents felt more dependent on others to get around and access the essentials*

Nearly all respondents lamented feeling more dependent on other people to travel and/or get what they needed, even if they had access to a household vehicle and a reliable driver. Results of other studies examining the travel behavior of people with disabilities and older adults suggest that independence and dependence are complex notions (Schwanen et al., 2012), and often "independence" may not mean doing something entirely on one's own, but instead, doing something on one's own terms. For instance, Kameswaran et al. (2018) found that using ridehailing services positively affected notions of independence among people with visual impairments in India. These individuals felt that being able to use ridehailing reduced their dependence on others to get around even though it required collaborating with a driver.

Independent travel has long been recognized as key to independent living (Suen and Mitchell, 2000), and independent living situations can be difficult for people with disabilities to achieve and maintain. Furthermore, feeling as though one cannot travel independently can result in discouragement, frustration, and other negative emotions, and contribute to depression, stress, and anxiety in people with disabilities, posing harm to their health (Crudden, 2018). During the pandemic, when people with disabilities are already at higher risk, feeling more dependent may be especially damaging.

In this study, respondents felt particularly dependent when they needed to rely on informal caregivers, like family and friends, more than usual for transportation. Respondents who lived with people over age 65, including spouses and parents, worried that relying on these individuals for help getting around or shopping put their loved ones at risk. This caused some respondents to feel not only more dependent than usual, but also guilty. One man in his sixties who has low vision recalled a recent trip to the grocery store,

> "Thursday morning my partner and I went down to the Safeway for their, sort of, 'Early Bird Specials.' They open the store up at seven o'clock for people over 60, because of COVID-19. And so we went down and got a bunch of groceries and it was the first time we've been out for some time. Today, upon reflection, we concluded that it may not have been the safest thing to do." [R11]

When asked why not, he explained that "in a place where there are a lot of folks together, i.e. stores, mass transit, etc.," he felt that him and his wife were not safe. "I'm 69, and my wife is 74. It's just not the way we want to be operating in the current climate." He said that they were planning to try ordering groceries online going forward, even though "we don't have a lot of confidence that [delivery services] are necessarily going to work right." He didn't want to ask his wife to continue shopping in person because, he said, "She's very anxious about getting ill."

Barriers that respondents encountered using transportation were, thus, both personal and relational. Respondents worried about using transportation because they were concerned about their own health and safety, but also about the well-being of individuals that help them use these services, including professional drivers and, more so, informal caregivers such as friends and family members. Several respondents limited their transportation use because of their concerns, cutting back even on essential trips, like those to the grocery store or to medical appointments.

### *4.2. Communications issues*

#### *4.2.1. A lack of up-to-date communications made respondents question if and how to travel*

Respondents encountered a number of difficulties using transportation and accessing the essentials because they were not aware of whether services or facilities were operating or open. Some also reported problems accessing up-to-date public health communications that might influence their travel decisions. A woman in her forties who uses a motorized wheelchair explained that a challenge for her and, she suspected, others using transportation during the pandemic was initially making decisions about, "Should I be traveling? What is essential?" She continued,

> "I think there's been so much mixed messaging for people … that's the first issue, it's deciding: are you getting the right advice or support? And then it's figuring out what is the best methodology for the trip. People don't know if paratransit is running or not … so people just have a lot of uncertainty. They're like, 'Can I take this service I normally take? Will this service come and get me?' You know, answers are a little bit different for everyone because all the services are really scrambling to figure out what their answers are and what is safe." [R15]

Several respondents reported that not knowing where and how to access accurate, timely transportation and public health guidance was a problem for them. Respondents were accustomed to taking routine transit trips using services and schedules that they knew. Some used apps like Google Maps for real-time transit information and navigation. They doubted now, first, whether it was advisable to use their usual services or to be traveling at all; second, whether the services were operating in their usual ways; and third, whether their sources for getting transportation information would be updated to reflect any changes.

#### *4.2.2. Some individuals encountered additional challenges because communications were inaccessible or because they did not use certain technologies*

Individuals who had less access to certain forms of information because of their disability (for instance, people who are blind or have low vision and cannot read print) and/or less access to and knowledge of how to use communications technologies such as smartphones encountered additional challenges. A man in his thirties who is blind remarked with frustration that accessing up-to-date information about

the state of COVID-19 where he lived was difficult because digital media outlets were not providing alternative text explaining information contained in charts and graphs [R03]. So, although he is very skilled at using screen readers and otherwise technologically savvy, he was unable to access up-to-date information about the virus and felt that this left him unable to judge the risk of traveling or participating in certain activities. When alternative text was provided, he said, it tended not to be particularly detailed. He suspected this was because the information was changing rapidly, but that it was nevertheless a problem that needed to be addressed.

Another respondent expressed worry that people with disabilities would suffer because they are already less connected and harder to reach. She explained,

> "I think that it's a big issue … how connected a person [with a disability] is. Not only is their lack of transportation access a problem, but how are they able to access information and know how to behave, or not, to protect themselves and the community?" [R19]

She echoed other respondents' comments that being able to use technology, assistive or otherwise, is extremely important for people with disabilities when it comes to staying connected and informed. When individuals are unable to access or use technology, she said, "for whatever reason, whether it's, they are physically not able to, they don't have the financial means, they're cognitively not able to … then they're isolated." She worried that being relatively isolated would leave some people unaware of how to meet their needs during the pandemic if their usual services were disrupted and unsure of how to act in accordance with public health guidelines.

#### *4.2.3. Paratransit operators kept riders informed through established communication channels*

Several respondents who used paratransit regularly reported that they were informed about service changes when they called to schedule a ride. Using paratransit typically requires scheduling a trip at least 24 hours in advance. This reservation system makes it such that paratransit agencies communicate to a greater extent and more directly with their riders than do other transit agencies. While such a system has its disadvantages (i.e., it poses a barrier to spontaneous travel), it did seem to be advantageous for disseminating updated transportation information to riders during the pandemic. In accordance with best practices described in Section 2.4, those involved in the pandemic response could leverage established avenues for communicating with some people with disabilities, such as paratransit reservation lines, to impart relevant messages. These might include communications about transportation system changes as well as public health updates.

### *4.3. Assistance issues*

#### *4.3.1. Respondents worried about getting needed assistance and asking too much of others*

Just as respondents were concerned about getting the information they needed to stay safe and healthy during the pandemic, several were also concerned about getting required assistance with tasks of daily living ranging from personal care to grocery shopping. Respondents who are blind or have low vision may rely on assistance from sighted people for help with navigation, or to pick out particular items while shopping. This assistance is usually provided using sighted guide, a technique in which a person who is blind or has low vision follows an individual that is guiding them by holding their arm. Sighted guide, and other strategies that some individuals who are blind or have low vision depend on, are difficult to perform from a distance. As one man in his sixties who has low vision bemoaned of getting help from store employees, "I had the luxury, from today's perspective, of being able to be close to people in physical proximity, without concern. That's no longer the case" [R11]. As a result, he didn't feel comfortable shopping independently anymore. A woman in her sixties who is blind described some challenges that she had encountered recently getting assistance,

> "I think people are a lot more reticent to help me because they have to come up and be near me, and I have to take their arm. So at one supermarket [store employees] were very skittish about giving me an assistant, whereas at another one, they were just normal. Also, I've had a volunteer who has walked with me once a week or so for the last couple of months, and I haven't heard anything from him … so I'm not sure whether that's because he's away from the community, or he just assumes that it's not going to happen, or whether he wouldn't want to get near me." [R08]

Other respondents reported that they were much more concerned about receiving continued assistance from strangers and store employees during the pandemic than from family, friends, and neighbors. However, some did not feel comfortable asking too much of their informal supporters. One woman in her fifties who has multiple disabilities described having set up a kind of "rotation" [R19], in which she asked certain friends for help some number of weeks apart so that she could continue to get needed assistance with shopping and delivery, but, hopefully, wouldn't burden any one friend too much.

Some respondents who used at-home formal caregiving services were having difficulty navigating concerns about their own health and safety, as well as caregivers' concerns during the pandemic. One woman in her forties who requires daily help with personal care explained,

> "There are a lot of decisions I feel like I have to make right now. Like, you know, somebody who has childcare, they can say, 'Oh, don't come. I'm going to take care of my kids.' I can't tell my caregivers, 'Don't come.'" [R15]

So she said that she was working on continuing care with a few trusted personal attendants who had agreed to keep working and to taking precautions to avoid getting or spreading the virus.

#### *4.3.2. Respondents were turning to delivery services, but had mixed experiences using them*

Several respondents were using delivery services to get essential goods, like groceries and medications. They hoped that using these services would reduce their own risk of infection, as well as risk that family and friends who normally help them with transportation and shopping might incur. Some respondents, however, were having trouble. A man in his seventies who is blind described a recent experience,

> "I'm using a delivery service for groceries, which is very interesting because I called Saturday with a grocery order and they said, 'Okay, it will be delivered Friday.' Meaning, this coming Friday! A whole week! That's because they're completely in demand. And so that's the best I could do schedule-wise." [R07]

Similarly, a man in his fifties who is blind and had used grocery delivery services without any problems in the past reported that lately his attempts to use them were "unsuccessful" [R13]. While he was able to select grocery items online and put them in his virtual cart, he said that there were no delivery times available when he tried to check out, so he was unable to ultimately place an order. He was relying on friends more than usual to get groceries and medications. He said that he intended to try alternative grocery and meal delivery options looking ahead.

Another respondent, a woman in her sixties who has low vision and had used grocery delivery services in the past, said that she had not used them recently. Although she recognized that they could be particularly useful during the pandemic, she explained,

> "The minimum order for most [grocery delivery services] is $35. I don't have a lot of storage space, and they don't seem to understand

the older disabled client who lives in a small space and does not have a pantry closet." [R10]

A myriad of personal circumstances influenced respondents' decisions to use delivery services or not. Some individuals who had access to household vehicles and drivers were less inclined to use them because they felt they didn't need to and perceived them to be unreliable. Other individuals used delivery services because they considered them to be better options than alternatives, like asking friends or family members for help; however, some were dissatisfied with the present quality of the services. A few respondents did not use them because of concerns about affordability or other practical matters, like storage space. Interestingly, several respondents in this study said that they used delivery services for their prescription medications but did not use grocery delivery options, suggesting barriers and facilitators to using delivery were unique to certain services.

## 5. Limitations and strengths

The research design employed in this study was not intended to produce a sample that was representative of any larger population of people with disabilities. The study sample includes notably high representation of individuals who reported being blind or having low vision as their primary disability type. This can be attributed to the study's sampling strategy, as many respondents were initially recruited to participate through Lighthouse for the Blind and Visually Impaired. All respondents were residents of urban areas, whereas people with disabilities in the U.S. tend to live disproportionately in rural areas. Furthermore, all respondents were living independently in the community rather than in group homes or other congregate settings. As discussed in Section 3.1, respondents represented a subset of participants recruited for a study conducted in the fall of 2019. Additional individuals were not recruited specifically for this research because of time and resource constraints. While this may have limited the sample somewhat, it was an advantageous approach for gathering respondents' perspectives at a critical and particularly uncertain time in the pandemic response, immediately following the adoption of the first shelter-in-place orders in the Bay Area.

Considering the sample is not representative and that transportation and public health conditions differ across geographies and are constantly evolving, it is not known how or whether the views that respondents expressed in this study capture those of individuals with disabilities more generally. This study's findings are nevertheless valuable, as they point to a number of ways in which the pandemic and response measures have affected if and how some people with disabilities have been able to access essential goods and services and maintain their health. They thus reveal avenues for intervention to make the pandemic response more accommodating to, and inclusive of individuals with disabilities.

## 6. Conclusions and recommendations

Findings from this study suggest that the pandemic is exacerbating many difficulties accessing transportation, as well as other essential goods and services that people with disabilities always face. These include challenges accessing reliable and safe transportation as well as up-to-date communications about transportation and public health, and difficulties getting needed assistance using transportation and completing activities of daily living. The pandemic response has made individuals with disabilities, particularly those without access to a household vehicle, worry that they have few options to get around and obtain what they need. Safety and health concerns kept many individuals from using transportation—even services that they believed were still operating, and even to perform essential activities like going to the doctor. Limiting travel poses a health risk to people with disabilities who are already more prone to transportation-related social exclusion and associated health risks, like feelings of perceived social isolation and delaying health care.

While more travel should not necessary be encouraged during the pandemic, transportation professionals should consider how they could mitigate wider health consequences of COVID-19 among people with disabilities. One way might be to provide members of this group with new, safe, accessible service options to make essential trips on demand. Transit agencies could accomplish this by partnering with on-demand service providers, like taxi and ridehailing companies. The San Francisco Municipal Transportation Agency leveraged such a partnership with Flywheel Taxi to develop the Essential Trip Card (ETC) program for San Francisco residents who have a disability and residents age 65 and older. The ETC program launched in April, and as of mid-July, over 15 hundred individuals had been approved for an ETC card and more than 5 thousand subsidized trips had been taken through the program (Graf, 2020). Other cities should explore developing and implementing similar initiatives.

People must be aware of the transportation options available to them before they can make a trip. A lack of up-to-date communications about transportation and public health kept some respondents in this study from feeling comfortable venturing out, even for essential trips. Others received updated information through established communication channels such as paratransit ride reservation lines. Those involved in the pandemic response must make a purposeful effort to ensure communications shared through established and new channels reach and are accessible to individuals with disabilities during this time of crisis. Public agencies and others who are in communication with vulnerable groups during the pandemic should work together to ensure that important health- and transportation-related messaging is available to members of such groups, and is provided in a timely manner and in a variety of formats (Matherly and Mobley, 2011; Nick et al., 2009). Planners could coordinate these integrated communications efforts and reach out to entities that they may not normally work with, like medical providers, to do so. Though some individuals with disabilities may be seeking medical care less than usual during the pandemic, many people must still get needed treatments and care. Innovative communications interventions could involve disseminating medical information as well as public health and transportation updates at points of care.

Because they found it difficult to use transportation and shop independently like they normally would during the pandemic, respondents in this study were relying on help from external supports, including formal and informal caregivers as well as delivery services, to get what they needed. Findings of this study agree with other works suggesting that people with disabilities may need to rely more than usual on their care networks and social support systems during emergencies; if these networks are disrupted, overwhelmed, or otherwise diminished, individuals with disabilities are at risk of having their needs go unmet (Stough et al., 2017). Those working on the pandemic response should consider creative ways to help people with disabilities access the essentials during the pandemic without having to rely on potentially vulnerable support systems. This might require identifying and monitoring individuals who are at particularly high risk (e.g., older adults with disabilities living alone), and offering them assistance and services directly.

The COVID-19 pandemic poses unique health risks as well as transportation and access challenges to people with disabilities. This population is not homogenous; results of this study and others, like Chakraborty (2020), highlight how challenges and risks differ based on individuals' personal characteristics and other factors. Future investigations focused on understanding how the pandemic and response measures are impacting people with disabilities must examine how impacts vary between sub-groups based on disability type and other sociodemographic characteristics (e.g., Rosenblum et al., 2020), as well as across living situations and geographies. Ensuring people with disabilities are included in the pandemic response requires, first,

conducting such research to understand problems, and then crafting innovative, tailored solutions for improving access to the essentials among this population now and looking ahead. People living with disabilities themselves must participate in these research and response efforts, ideally in leadership roles (Simon et al., 2013). In the very near term, work is needed documenting the development, and more importantly, implementation of programs and strategies intended to improve access to transportation, up-to-date communications, and other essentials for people with disabilities to evaluate their local effectiveness and potential broader applications.

## 7. Author's statement

Abigail L. Cochran: Conceived, researched, wrote, and edited the entire article.

## 8. Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## 9. Competing interests statement

The author has no competing interests to declare.

## CRediT authorship contribution statement

**Abigail L. Cochran:** Conceptualization, Investigation, Writing - original draft, Writing - review & editing.

## Acknowledgements

I am grateful to all study respondents for sharing their time and valuable insights. I thank LightHouse for the Blind and Visually Impaired and the Center for Independent Living for their help with recruiting participants. The University of California, Berkeley, Undergraduate Research Apprentice Program (URAP) funded two students who assisted with this research: Jordan Collins and Rachel Schten. I thank them for their help. This research was presented in an early stage at the Pandemic Urbanism Symposium, hosted by the University of Washington in May 2020. I thank all event attendees for their feedback. I am further grateful to Dan Chatman, Tamara Kerzhner, Michael Montilla, Marcel Moran, and Manuel Santana Palacios as well as the four anonymous reviewers of this paper for their invaluable comments.

## Appendix A. Interview protocol

*1. Introduction*

Hello, my name is Abigail Cochran. I am contacting you per our previous arrangement to follow up on our previous interview, and to ask you some more questions about your day-to-day travel experiences and attitudes towards transportation. I am particularly interested in whether and how your behavior and attitudes have changed since mid-February 2020, following the COVID-19 outbreak.

Before we begin the interview I would like to confirm that you have reviewed the consent form that I sent previously. Do you have any questions? If you're comfortable with it, I will record our conversation for the purpose of accuracy. The recording will not be shared with anyone outside of our trained research team, and will be stored securely. Furthermore, I will destroy the recording once I am able to transcribe it. Sensitive personal identifying information described during the interview, including your name, will be kept as confidential as possible barring your agreement of release. Is this okay with you? I expect this follow-up interview will take between 15 and 45 min of your time. Know if you are uncomfortable with a question or continuing at any time, you may stop the conversation or ask to move on to another question. I really appreciate your participation.

**2. Preliminary information**

Demographics: Age, City of Residence, Employment Status, Disability Status

**3. Follow up on a typical day**

I'd like to get a sense of how or whether your daily routine has changed in the past month or so. Would you mind walking me through what you did yesterday?

Inquire/note what activities the interviewee engaged in, and how they traveled between activities (if they traveled at all).

How has the way you travel around, generally, changed since mid-February?

Do you feel as though it has become more difficult for you to get around in the past month? Has this made it more difficult for you to do things that you want to do? If so, why?

Inquire here about why – Service changes? Scheduling? Relying on others? Etc.

**4. Transportation and Wrap-Up questions**

Are you using transit or paratransit at this time? Are you taking taxis? Are you using ridehailing services like Uber and Lyft? Do you believe that your friends are using these services?

a. *Inquire why/why not? about the experience for each service.*

How has practicing self-isolation, if you've done so, affected your day-to-day travel? What about your interactions with others? [If respondent is employed] Have you been able to continue your work by telecommuting?

Do you usually require any assistance with completing tasks of daily living? What about occasional tasks, like shopping? If so, have you been able to get the care or assistance that you need from family, friends, or attendants/caregivers?

What kinds of unique challenges do you think people with disabilities are facing regarding transportation and travel in wake of the COVID-19 outbreak?

What are you most worried about in the realm of transportation when you consider the effects of, and responses to, the COVID-19 outbreak? How do you anticipate day-to-day travel and transportation may change for you in the next year?

Thank you for your time. If I have any follow-up questions or concerns about the information you have provided during this interview, may I contact you for clarification? Thank you, again.

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