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Authors

Arseneault, Doug

Pierce, Gregory

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Accelerating Transportation Equity

Innovative Partnership Models for Achieving
Equitable Micromobility Access in Mid-Sized Cities

By Doug Arseneault and Gregory Pierce

Client: ClimateWorks Foundation

UCLA Luskin Center
for Innovation

AUTHORSHIP

This report was produced by the UCLA Luskin Center for Innovation (LCI).

» **Doug Arseneault**, graduate student researcher, LCI

» **Gregory Pierce**, co-director, LCI

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DISCLAIMER

The views expressed in this paper are those of the authors alone. They do not necessarily reflect the views of the Luskin Center for Innovation.

FOR MORE INFORMATION

Contact: Gregory Pierce, gpierce@luskin.ucla.edu

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Source: Los Angeles Department of Transportation

EXECUTIVE SUMMARY

ONE WAY TO MAKE SHORTER TRIPS more convenient, like those to and from transit stops, is to use a small, low-speed, human- or electric-powered transportation device – also known as micromobility. Often in the form of shared bicycles and scooters, the use of micromobility systems across the United States has exploded over the last decade. Unfortunately, access to these forms of transportation is not equitable in terms of race and socioeconomic status — which we define as mobility-disadvantaged. To address these inequities, many cities have enacted new requirements, but they are inconsistent and vary across the nation.

To date, most academic research on micromobility equity does not incorporate the perspectives of private micromobility providers or community-based organizations (CBOs). Further, few analyses have focused on mid-sized cities that have qualities that support strong public-private-nonprofit relationships focused on equity and where the majority of private micromobility companies operate.

This report highlights innovative micromobility programs, launched between 2019 and 2021, that are aimed at implementing equitable practices and

achieving equitable outcomes in five mid-sized U.S. cities: Denver, Colorado; Minneapolis, Minnesota; Oakland, California; Pittsburgh, Pennsylvania, and Saint Paul, Minnesota. The study focuses on the roles of city governments, privately managed dockless bicycles and scooter providers, and CBOs in these programs. Drawing from interviews, this report offers precedent-setting models and actionable steps for cities, large and small, to expand affordability among low-income and Black, Indigenous, and people of color (BIPOC) travelers and improve infrastructure in their communities.

Affordability Recommendations

Recommendations for micromobility providers and cities to increase affordability include: redesigning equity programs, engaging communities, integrating multiple modes of transportation, and simplifying the eligibility process.

Equity Program Redesign

Based on data and engagement with CBOs, experts, and customers, providers should reevaluate the structure of their equity pricing programs, including pricing models, enrollment processes, memberships, and no/low-tech payment options.

Community Engagement

City officials, provider staff, and CBOs should collaborate to publicly disseminate information about available programs through appropriate channels and directly engage low-income and BIPOC travelers to ensure that they understand how to apply for discount memberships and rides.

Multimodal Integration

Cities and micromobility providers should think holistically about affordable transportation for low-income and BIPOC travelers by designing equity pricing programs that support multimodal connections. Micromobility equity pricing programs should be integrated with reduced fare programs for mass transit, microtransit, ride-hail/ride-share, car-share, and other shared mobility services.

Umbrella Eligibility

Providers and CBOs should simplify eligibility for equity pricing programs by integrating the enrollment process with existing social service programs or eliminating the application process entirely by leveraging geofencing.

Infrastructure Recommendations

The authors also offer recommendations to improve infrastructure through: developing dedicated lanes and parking, using vehicle deployment and rebalancing best practices, integrating multiple modes of transportation, and engaging communities.

Dedicated Lanes and Parking

Cities should expand the quality and quantity of infrastructure that supports micromobility use including: micromobility parking zones and racks, bicycle lane networks, and intersection treatments, such as bicycle signals and beacons. They should take a data-driven approach, in collaboration with tailored community knowledge from CBO partners, to decide where to invest in these improvements.

Deployment and Rebalancing of Vehicles in Mobility-Disadvantaged Communities

Cities and providers should establish data-driven methodologies and systems for distributing micromobility vehicles to ensure reliable access among mobility-disadvantaged travelers.

Multimodal Integration

Cities and providers should think holistically about the journey of mobility-disadvantaged travelers by investing in infrastructure that facilitates seamless transfers between micromobility vehicles and other shared vehicles and services, such as mobility hubs and slow lanes.

Community Engagement

Cities, providers, and CBOs should actively seek input from mobility-disadvantaged travelers on their travel needs, barriers to adoption, vehicle designs, deployment strategies, and right-of-way improvements. CBOs are invaluable partners in community engagement as trusted entities within mobility-disadvantaged communities.



Source: Xavier Lorenzo

INTRODUCTION

MICROMOBILITY IS A SMALL, LOW-SPEED, human- or electric-powered transportation device, including bicycles, scooters, and other lightweight, wheeled conveyances (Price et al, 2021). Micromobility systems have evolved dramatically since the first modern bike-share system launched in Washington, D.C., in 2010. For nearly a decade, bike-share systems were typically entirely government owned or heavily subsidized and maintained stagnant ridership numbers (DuPais et al, 2019; MacArthur et al, 2019).

This changed in 2017 and 2018, with the rapid scaling of Bird and Lime’s dockless¹ bicycles and kickstand e-scooters (DuPais et al, 2019). Privately funded and operated, these companies catapulted micromobility into a popular transportation mode. Free from the infrastructure costs of docking stations and fiscal limitations of municipal budgets, dockless vehicles could be deployed anywhere with sidewalks (DuPais et al, 2019). Micromobility adoption more than doubled from

35 million trips in the United States in 2017 to 84 million trips in 2018 (NACTO, 2019). Over the next two years, more than a dozen private micromobility companies launched (DuPais et al, 2019). With more than 136 million trips in 2019 – a 45% increase over the prior year – across 109 cities, the micromobility industry grew at an exponential rate, on pace to reach \$300 million – 500 million by 2025 (NACTO, 2020).

¹Unlike “docked” micromobility vehicles that are picked up and returned to physical stations with external locks, dockless micromobility vehicles can be picked up and dropped off anywhere within a designated boundary in a city and feature wheel-locking technology integrated into the individual vehicles (Urbanism Next, 2022).

While this micromobility revolution offers renewed hope for reducing automobile trips, access to bike- and scooter-share systems is not equitable with respect to race and socioeconomic status (Dill & McNeil, 2020; MacArthur et al, 2019). White, affluent men comprise the vast majority of micromobility users (Dill & McNeil, 2020; Lusk, 2019; MacArthur et al., 2019). In response to calls from advocacy groups and equity-minded government officials, many cities enacted regulatory requirements to improve the distribution of micromobility vehicles in low-income and predominantly Black, Indigenous, and people of color (BIPOC) communities, and to expand the affordability of these systems (DuPais et al, 2019). However, these regulations are not consistently applied and vary in cities across the country (MacArthur et al, 2019; Brown et al, 2022). Further, strict requirements can dissuade micromobility operators from launching or expanding in rapidly growing regions, particularly mid-sized cities.

These equity concerns became ever more important in 2020 among the COVID-19 pandemic and Black Lives Matter protests. The pandemic caused growth in the micromobility industry to slow, even as predominantly BIPOC essential workers continued to need access to micromobility. More than 42% of micromobility companies suspended operations for part of 2020 (BTS, 2021). The political and social reckoning spurred by the Black Lives Matter protests elevated the importance of equity considerations both within city governments and among the leadership of micromobility companies.

While equity requirements in large cities have received extensive focus in academic and nonprofit research (MacArthur et al., 2019; Brown et al., 2022), little analysis has focused on mid-sized cities. Further, this research often does not incorporate the perspectives of private micromobility providers or the community-based organizations (CBOs) that work directly within low-income and majority BIPOC communities.

This report focuses on innovative micromobility programs launched between 2019 and 2021 in mid-sized cities, with a particular focus on equitable practices of providers and the support of CBOs in achieving equitable outcomes. Highlighting mutually beneficial partnerships between city officials, private providers, and CBOs in five cities across diverse regions in the U.S., this report offers models for cities, large and small, to expand affordability among low-income and BIPOC travelers and improve infrastructure in their communities. Drawing from interviews with practitioners, this report offers unique insights and actionable steps to enhance equitable access to micromobility systems.

PAST RESEARCH:

MICROMOBILITY ACCESS AMONG BLACK, INDIGENOUS, PEOPLE OF COLOR AND LOW-INCOME COMMUNITIES

MICROMOBILITY OFFERS FREEDOM of movement competitive with personal vehicles. With average speeds of 10-15 mph, micromobility vehicles reduce travel times associated with walking to destinations, making them well suited for short trips and filling first/last-mile gaps to transit stops.

The biggest group of Americans who bike to work live in households that earn less than \$50,000, of which the majority earn less than \$10,000 (Lusk, 2019). Bicycling is also growing among nonwhite communities (Lugo, 2018; Butler, 2020). Studies in lower-income neighborhoods in Brooklyn and Boston found that the majority of bicyclists were nonwhite, consistent with the high level of overlap between low-income and nonwhite households (Lusk, 2019). Although shared electric scooters (e-scooters) are a relatively new market sector, early research indicates that these bicycling trends extend to scooting (Dill & McNeil, 2020; NACTO, 2020). Low-income people express a significantly higher level of support for e-scooters relative to more affluent households (Martin, 2019).

Yet, the majority of micromobility users are white and affluent, matching the demographics of typical early adopters of new technology (Dill & McNeil, 2020). This trend led dockless micromobility companies to initially prioritize deployment in more affluent and predominantly White areas (Cohen & Cabansagan, 2017).

However, in cities that mandated equitable distribution of vehicles from the outset – such as Baltimore and Portland – nonwhite ridership matches the racial distribution in these cities (Dill & McNeil, 2020). Micromobility trends in Washington, D.C., offer a prime example of the effect of equity mandates. Launched in 2008, Capital Bikeshare was the first public-private partnership of a docked bike-share system in the U.S. Six years after launch, ridership among Black people remained five times lower than whites. Yet, Black people make up a quarter of the service area’s workers (LDA Consulting, 2017). In contrast, after e-scooters were

permitted in 2018 with distribution equity requirements, Black ridership of dockless micromobility in the D.C. region – including several suburbs – trailed white ridership by only 9% within the first year after launch (Dill & McNeil, 2020).

While ridership among low-income and BIPOC is growing, these populations face two significant challenges: affordability, including payment options and adequate infrastructure for riding micromobility vehicles.

Affordability

Micromobility companies are working with cities to offer discounted rates for low-income travelers. As the largest bike-share operator in the U.S., Lyft offers a \$5 annual bike-share membership for qualifying low-income residents and only 5 cents per minute for dockless e-bikes (Divvy, 2022; NiceRide, 2022; PDT, 2022; Lyft, 2022a). Lime, the scooter-share leader, offers free trips and up to 70% discounted rates for low-income users in several cities (Lime, 2022a; Lime, 2022b). Other operators, including Spin and Bird, have similarly discounted rates for low-income users (PDOT, 2022; Bird, 2022; Spin, 2022).

Dockless micromobility typically requires a smartphone, cellular data access and a credit card, a combination that many low-income and BIPOC individuals lack (Palm et al, 2020). However, several cities mandate that micromobility companies offer cash-based options (Palm et al, 2020). The national Lime Access program allows users to load funds at convenience stores through the PayNearMe platform (Lime, 2022a). Lyft Bikes’ “For All” programs actively encourage users to pay using

prepaid cards available at major retailers (Divvy, 2022; NiceRide, 2022). Market-pioneer Bird scooters first introduced a text-to-ride scheme in Washington, D.C., a system that is now standard across all cities where it operates (Bird, 2022; Transportation for America, 2018). Lyft, Lime, and Spin offer comparable programs for customers with limited data plans or without smartphones (Divvy, 2022; Lime, 2022a; Spin, 2022).

Infrastructure

Docked bike-share systems have attempted to fill first/last-mile gaps between transit corridors, residences, and employment centers. However, bike-share users must walk to docking stations, failing to compete with the door-to-door access of cars (Qian & Jaller, 2020). Dockless vehicles are typically available citywide with specific requirements for deployment and midday redistribution of vehicles – known as “rebalancing” – in low-income and majority BIPOC communities (DuPuis et al, 2019). Compared to docked bike-share systems, dockless bikes and scooters tend to better serve low-income residential areas and suburban job centers where BIPOC and low-income residents work.

For instance, in Chicago, micromobility access increased the average number of jobs reachable by a city resident within 30 minutes by 16% compared to employment opportunities accessible by transit and walking (Smith & Schwieterman, 2018). E-scooters specifically increased the number of transit trips that are time competitive with driving from 47% to 75% among travelers who switched from walking to using e-scooters to access bus stops (Smith & Schwieterman, 2018).

Door-to-door access is possible by parking on sidewalks adjacent to employers and service providers (Palm et al, 2020). Prioritizing trips under 3 miles, dockless micromobility companies actively coordinate with transit agencies and cities to deploy e-bikes and e-scooters at transit stops, prioritizing low-income and majority BIPOC communities (DuPais et al, 2019; Smith & Schwieterman, 2018; SFMTA, 2019).

Bicyclists and scooter riders require safe infrastructure, which is lacking in most majority-minority neighborhoods (Barajas, 2020). Black and Hispanic bicyclists disproportionately experience crashes, and the frequency of crashes is highest in areas with higher populations of nonwhite residents, lower median income, and high levels of poverty (Barajas, 2018). Low-effort bicycle infrastructure, such as sharrows and painted lines, often conflict with parking lanes and transit stops. As a result, these elements fail to reduce the frequency of crashes involving Black and Hispanic cyclists (Barajas, 2018). Community-based advocates assert that improvements must be made in collaboration with BIPOC and low-income travelers to prevent the perception of gentrification (Butler, 2020; Thomas, 2020; Lugo, 2018). Low-income and nonwhite communities deserve “wide, stenciled, red-painted, surface-lighted, barrier-protected, bicycle-exclusive cycle tracks” (Lusk, 2019).

This report takes into account these considerations about affordability and infrastructure investments and seeks to expand knowledge of practical, actionable practices to achieve equitable outcomes. With a focus on mid-sized cities, this report explores the potential of formal partnerships among city officials, micromobility provider staff, and CBO leaders aimed at addressing these documented barriers to micromobility adoption among low-income and BIPOC travelers, henceforth known as “mobility-disadvantaged communities.”²

²See **Analytical Framework**, page 11, for further discussion of this term.

METHODOLOGY

Case Study Selection

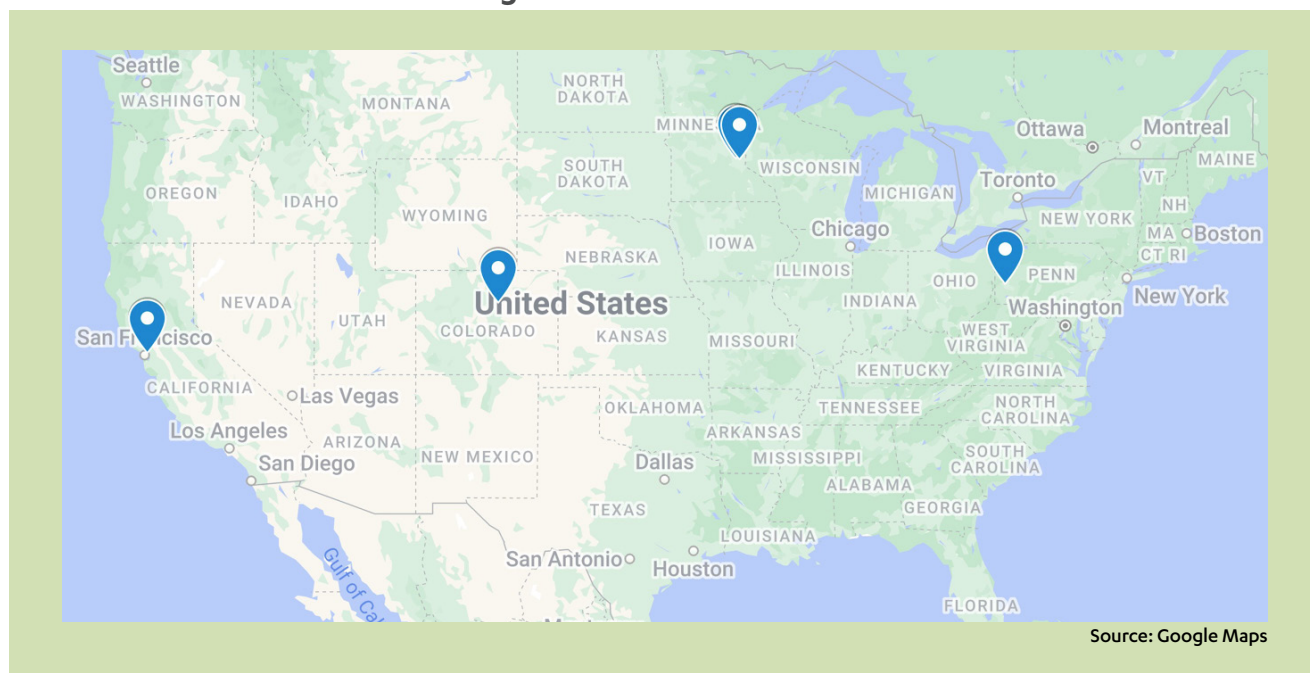
This report focuses on shared micromobility programs among privately managed dockless bicycles and scooter providers in these mid-sized cities in the U.S. that were launched between 2019 and 2021. We define “mid-sized cities” as municipalities with populations between 250,000 and 750,000. Mid-sized cities are the majority of service areas where private micromobility companies operate. Yet, these cities are underrepresented in the literature and news coverage of micromobility programs compared to larger cities.

Based on a national search of micromobility program requirements and regulations, we found that the largest cities – in terms of population (greater than 2 million residents) – generally operate under Request for Proposals (RFP) processes tied to long-standing equity programs unique to each city. These densely populated cities with large customer bases possess significant market power that enables their regulators to demand very specific, often arduous requirements that private providers are willing to meet. The next largest cities – those exceeding 750,000 residents – operate under an open permitting process; derivative of the regulatory framework established by city regulators in Austin, Texas, an early adopter. Neither of these models are applicable to most cities.

In contrast to these larger cities, mid-sized cities have several qualities that support strong public-private-nonprofit relationships focused on equity: less-entrenched city bureaucracies, strong civic society actors, and growing nonwhite populations (both in population and political coalition-building), as well as moderate density with market potential attractive to providers but with insufficient market power for cities to enact strict requirements.

We selected five cities of focus: Denver, Colorado; Minneapolis, Minnesota; Oakland, California; Pittsburgh, Pennsylvania, and Saint Paul, Minnesota (Figure 1). These cities developed programs that are innovative and replicable, requiring minimal politically fraught

Figure 1: CITIES OF FOCUS



changes to policies or regulatory requirements. Their programs offer models that could be applied in larger cities, particularly those with moderate density and populations between 750,000 and 2 million. These models could also be implemented by small cities and unincorporated areas with densely populated areas, such as central business districts or large universities.

Analytical Framework

Based on a national search of micromobility programs, we found that partnership models were designed to address two core aspects of mobility regarding distributive justice: affordability and infrastructure. Affordability includes measures to address financial barriers, such as pricing and methods of payment. Infrastructure aspects include requirements to ensure convenient spatial access to micromobility vehicles in areas with a history of underinvestment in transportation infrastructure and/or large populations with low levels of personal vehicle ownership.

These areas of focus are intricately linked. Affordability efforts, such as discounted pricing and cash-based payment options, are underutilized if vehicles are unavailable in their area (infrastructure). Similarly, good infrastructure in terms of micromobility vehicles and safe travel paths in mobility-disadvantaged communities will go unused if pricing is too high (affordability).

Mobility-Disadvantaged Travelers and Communities

While no universal definition exists for “mobility-disadvantaged,” we define the term as incorporating both individual households and neighborhoods that face barriers to transportation access. Socioeconomic factors include a disproportionately high cost burden for transportation needs compared to other household expenses and the impacts of structural racism on access to credit cards and smartphones, which are necessary to access micromobility vehicles and systems. Physical barriers include historically low investment in roads and sidewalks, which is infrastructure necessary to support micromobility use.

Mobility-disadvantaged travelers reside in households with incomes below the federal poverty threshold

and include people of color including those of Black, Indigenous, and people of color (BIPOC), including those with limited English proficiency (mobility-disadvantaged travelers). Mobility-disadvantaged communities include neighborhoods or local community areas with a high proportion of these householders/travelers.

Data Collection

Because the micromobility sector is rapidly evolving and the cities’ programs were actively operating during the research period, we determined that semi-structured interviews were the most appropriate research method. The interviews were guided by a set of common questions, but follow-up questions and conversation were unstructured within each interview.

We interviewed a total of 22 stakeholders. Interviewees included: city program managers in all five cities; local, regional, and national representatives from private micromobility operators administering programs in these cities; and CBOs that partner with city officials and providers on programs in three of the cities. We also conducted a preliminary interview with the city representatives in Austin, Texas, to understand their widely used regulatory model and establish a baseline for comparison with the programs operating in the five cities. Preliminary interviews were also held with two regional organizations that led programs designed to encourage mid-sized cities in their regions to launch shared micromobility programs. However, these two programs were ultimately determined to be outside the scope of this project and their programs were excluded from further analysis.

The interviews took place between June and September 2021 via web conferencing or telephone. The interviews lasted an average of 60 minutes.

To prepare for the interviews, we reviewed each city’s program requirements and websites, as well as news coverage of program activities.

FINDINGS:

PROJECT HIGHLIGHTS

INTERVIEWEES SHARED EXTENSIVE INSIGHTS on their programs and practices for expanding access to micromobility systems and building mutually beneficial partnerships among city governments, providers, and CBOs to promote equitable access to micromobility systems. The following project highlights offer particularly innovative operational models centered on expanding affordability and improving infrastructure – including micromobility vehicle access and safe riding paths – to expand access among mobility-disadvantaged travelers and within mobility-disadvantaged communities.

AFFORDABILITY

Lyft Up East Oakland: Mobility4All (Oakland)

IN FEBRUARY 2019, LYFT joined the City of Oakland and CBOs TransForm, East Oakland Collective, and The Original Scrapper Bike Team to launch a \$1 million partnership to expand mobility access called “Lyft Up East Oakland” (Oakland, 2019a). With Lyft contributing 70% of the funding, this partnership envisioned a multimodal package for low-income residents dubbed Mobility4All; community-based placemaking to create “mobility hubs” around bike-share docking stations and a CBO-run bike lending library to expand bike access in areas without docking stations (Oakland, 2019a).

The partnership arose from Oakland’s 2019 Bicycle Plan update, in which the city contracted with TransForm and

East Oakland Collective to lead community-grounded discussions (Oakland, 2019c). This strategy built on the CBOs’ past engagement work backed by the regional Metropolitan Transportation Commission and national Better Bike Share Partnership (Cabansagan, interview, August 27, 2021). The Original Scrapper Bike Team also led deep listening sessions (Oakland, 2019c). City officials and CBOs engaged Lyft as the bike-share system’s new operator and stressed that the company should not rely on CBOs to conduct outreach on their behalf (Cabansagan, interview, August 27, 2021). Through the bike plan engagement process, community members expressed fear that expansion of the bike-share system



Source: TransForm

would lead to gentrification and displacement (Oakland, 2019c). Residents also expressed skepticism of private operation and corporate sponsorship of the system – known then as Ford GoBike (Oakland, 2019c). Safety was a central theme, citing poor pavement conditions and police discrimination leading to fears about vulnerability while biking and inconsistent reporting of crashes (Oakland, 2019c).

As part of the Lyft Up partnership, Lyft promoted its equity pricing initiative Bike Share for All (Lyft, 2019). Low-income Oakland residents were eligible for \$5 annual membership to the rebranded “Bay Wheels” bike-share system (Oakland, 2019a). To expand enrollment, Lyft hosted daily sign-up events at three libraries, where residents could also pay cash to add credit to their account (Lyft, 2019). While Lyft offered equity pricing across its bike-share markets, Lyft Up was the first program in the country to anchor reduced-cost bike-share memberships as part of a multimodal program. Incorporating free ride-share trips and sponsored transit passes, the initiative aimed to build a mobility wallet for low-income residents (Oakland, 2019a). TransForm’s New Mobility Policy Director, Clarrissa Cabansagan, celebrated this effort, noting that “most of the time, cost is the barrier” (Cabansagan, interview, August 27, 2021).

Unfortunately, the Lyft Up initiative faced implementation challenges. Lyft’s program enrollment sessions were scaled back to weekly sessions by December 2019 amid Lyft’s discontinuation of scooters in the Bay Area market; the sessions were suspended entirely in March 2020 due to the COVID-19 pandemic (Lyft, 2019; Lyft, 2022). The infrastructure elements – mobility hubs and the bike lending library – were delayed due to four factors: social distancing restrictions related to the pandemic; Lyft’s reduced presence in Oakland after the end of scooter operations and abandonment of e-bike launch plans; limited institutional capacity at the CBOs, and philosophical hesitance by other CBOs to accept Lyft’s corporate funds (Cabansagan, interview, August 27, 2021).

Despite these setbacks, the Lyft Up partners remained committed to instituting the infrastructure improvements, according to the interviewees. Oakland

city officials launched Slow Streets program pilots, which laid the groundwork for removing permitting barriers to establishing mobility hubs (Olsen, interview, June 16, 2021). In addition to establishing hubs at parklets as originally envisioned in the Lyft Up partnership, TransForm pursued funding from the California Air Resources Board and Metropolitan Transportation Commission to launch hubs at affordable housing complexes near light rail stations in East Oakland (Cabansagan, interview, August 27, 2021). The city program team and TransForm directly hired residents to survey their neighbors, conduct needs assessments, and lead education and sign-up events at potential hub locations (Cabansagan, interview, August 27, 2021; Olsen, interview, June 16, 2021). To institute the bicycle library concept, the city successfully pursued a \$1 million grant from CALSTART to purchase 500 e-bikes (Olsen, interview, June 16, 2021). The program will offer long-term rentals for e-bikes through bike shops, with priority for BIPOC and low-income riders (Olsen, interview, June 16, 2021).

Lyft Up also led to a broader cultural shift by expanding the organizational capacity of the small CBOs involved in the partnership (Cabansagan, interview, August 27, 2021). For instance, the East Oakland Collective – a Black-led organization – built upon its grassroots organizing to form an independent Community Planning team that proactively develops programs and policy recommendations related to transportation access (EOC 2021; Cabansagan, interview, August 27, 2021). The East Oakland Collective is also actively pursuing other grant opportunities, relying on TransForm for grant-writing support rather than direct funding support (Cabansagan, interview, August 27, 2021).



Source: Move PGH

Move PGH (Pittsburgh)

GUIDED BY THE MISSION to “provide all Pittsburghers with access to more transportation choices,” the City of Pittsburgh launched Move PGH in July 2021, an exclusive partnership of mobility companies led by micromobility provider Spin (Move PGH, 2022a).

Move PGH arose from conversations with community leaders in early 2019 supported by the international think tank the New Urban Mobility alliance (Ricks, interview, July 14, 2021). Concerned about the lack of equity considerations in open permitting models for e-scooters, the city’s Department of Mobility and Infrastructure released an RFP for a single e-scooter company to form a mobility consortium that leverages the existing public transit service through Port Authority of Allegheny County, now known as Pittsburgh Regional Transit and the nonprofit bike-share system Healthy

Ride, now known as POGOH (Ricks, interview, July 14, 2021). Pittsburgh received special state legislative authorization to allow a dockless scooter-share system, which are banned in other parts of Pennsylvania (Blazina, 2021; Ricks, interview, July 14, 2021).

Spin was awarded the contract in late 2019, in partnership with Zipcar, Waze Carpool, Swiftmile, Transit App, and Masabi to integrate car-sharing, carpooling, scooter charging, and digital payment for scooters (Spin, 2019b). Known as the Pittsburgh Mobility Collective, the consortium was designed to create “an authentic partnership, rather than a walled garden [between competing micromobility companies]” (Ricks, interview, July 14, 2021). The city’s Department of Mobility and Infrastructure is the policy lead, while Spin serves as the operational lead (Move PGH, 2022b).

Through Move PGH, low-income residents are eligible for free 15-minute rides on Healthy Ride bikes and a 50% discount on scooter rides through the “Spin Access” program (Move PGH, 2022c). Transit App offers a single digital platform for trip planning for all services, beginning with Port Authority and Healthy Ride, with plans to integrate Spin and Zipcar into the application. Masabi’s Justride platform is integrated with Transit App to provide a unified fare payment for all services (Move PGH, 2022b). Regardless of enrollment in the program, Spin users automatically receive a 25% discounted rate within dedicated “Access Zones” in mobility-disadvantaged communities (Move PGH, 2022c). Users can also access incentives to park at scooter charging stations provided by Swiftmile as the foundation for mobility hubs (Move PGH, 2022d).³

Move PGH plans to take this innovative model to the next level with the establishment of a Universal Basic Mobility program. Through this program, low-income residents will have access to unlimited bike and transit rides, five Spin rides per day and a membership and credit for Zipcar (Move PGH, 2022c).

To evaluate the potential of the Universal Basic Mobility program, in August 2022, the Richard King Mellon Foundation and Spin funded a one-year pilot with 50 residents from two mobility-disadvantaged neighborhoods (Spin, 2022b). All participants had to have a 50% area median income or lower, with priority for households without vehicles (Burton-Falk, interview, August 20, 2021). The Move PGH program team is contracting with the Manchester Citizens Corporation, a major CBO serving the neighborhoods, to lead engagement on the program. According to Executive Director LaShawn Burton-Falk, the program will help to counter the mindset that “these things [micromobility vehicles] are not for us” and that the expansion of micromobility systems in the neighborhood will cause gentrification (Burton-Falk, interview, August 20, 2021). Manchester’s engagement will initially focus on affordable housing residents (Burton-Falk, interview, August 20, 2021), and Carnegie Mellon University will evaluate the pilot (Spin, 2022b).

³See Infrastructure case study on Mobility Hubs (Minneapolis), **page 16**, for further discussion of this concept.



Source: Minneapolis Public Works

INFRASTRUCTURE

Mobility Hubs (Minneapolis)

IN 2019, THE MINNEAPOLIS Department of Public Works launched the first multisite “mobility hub” pilot in the country. Anchored by a high-frequency bus stop, Minneapolis’ hubs featured docked bike-share stations and dedicated space for dockless scooters and other shared vehicles, as well as wayfinding signage and placemaking features, like seating and planters (Rasp et al, 2020).

Arising from the engagement process for the city’s Transportation Action Plan, the hub program was developed to address resident requests for city officials to take a more active role in managing and promoting micromobility options (Rasp et al, 2020). The program also supported the plan’s focus on holistic equity by creating a transportation system that supports both equitable opportunities and outcomes. Equity was woven through the program in an effort to ensure “at the end of the pilot, those benefits didn’t all disappear or negatively impact vulnerable users’ travel patterns” (Rasp et al, 2020, 7).

City officials prioritized spatial equity (Rasp et al, 2021; Elkins, interview, July 23, 2021). The 25 hubs were located across 14 neighborhoods, most of which are mobility-disadvantaged “Areas of Concentrated Poverty”

as designated by the local metropolitan planning organization or have a high number of mobility-disadvantaged travelers (Rasp et al, 2020). According to Danielle Elkins, who oversaw Minneapolis’ scooter and mobility hub programs, “Right off the bat, we chose the hardest places” in terms of access to micromobility vehicles and right-of-way infrastructure (Elkins, interview, July 23, 2021).

The city program team also looked to build trust with neighborhood leaders, as well as build capacity within communities to participate in visioning. Community partners included neighborhood associations, corridor businesses, public health organizations/health service providers, youth organizations, and local artists. Community leader and user feedback influenced the layout and design of the hubs throughout planning and operation. Early engagement with neighborhood leaders in mobility-disadvantaged communities through the city’s Green Zone initiative led to extending the pilot time frame from one month to the entire season of micromobility use, from late spring through late autumn (Rasp et al, 2020).

Throughout operation, city officials set out to “create a platform for interactive community engagement”

Figure 2: **POP-UP EVENTS, MINNEAPOLIS**



Source: Minneapolis Public Works

(Rasp et al, 2020, 8). The project team used hubs as centralized points to understand first/last mile mobility gaps and test solutions. In addition to information boxes at each site, the city program team contracted in-person engagement to The Musicant Group, a local firm specializing in placemaking. At pop-up events (Figure 2), attendees could test micromobility options in a safe, controlled environment and the project team and mobility provider staff could educate users on safe riding practices. These test rides also relieved the financial and technological barriers for community members to try riding micromobility vehicles. With equity in mind, attendees also received information about mobility options, each providers' equity pricing programs, and discount codes for future rides (Rasp, 2020).

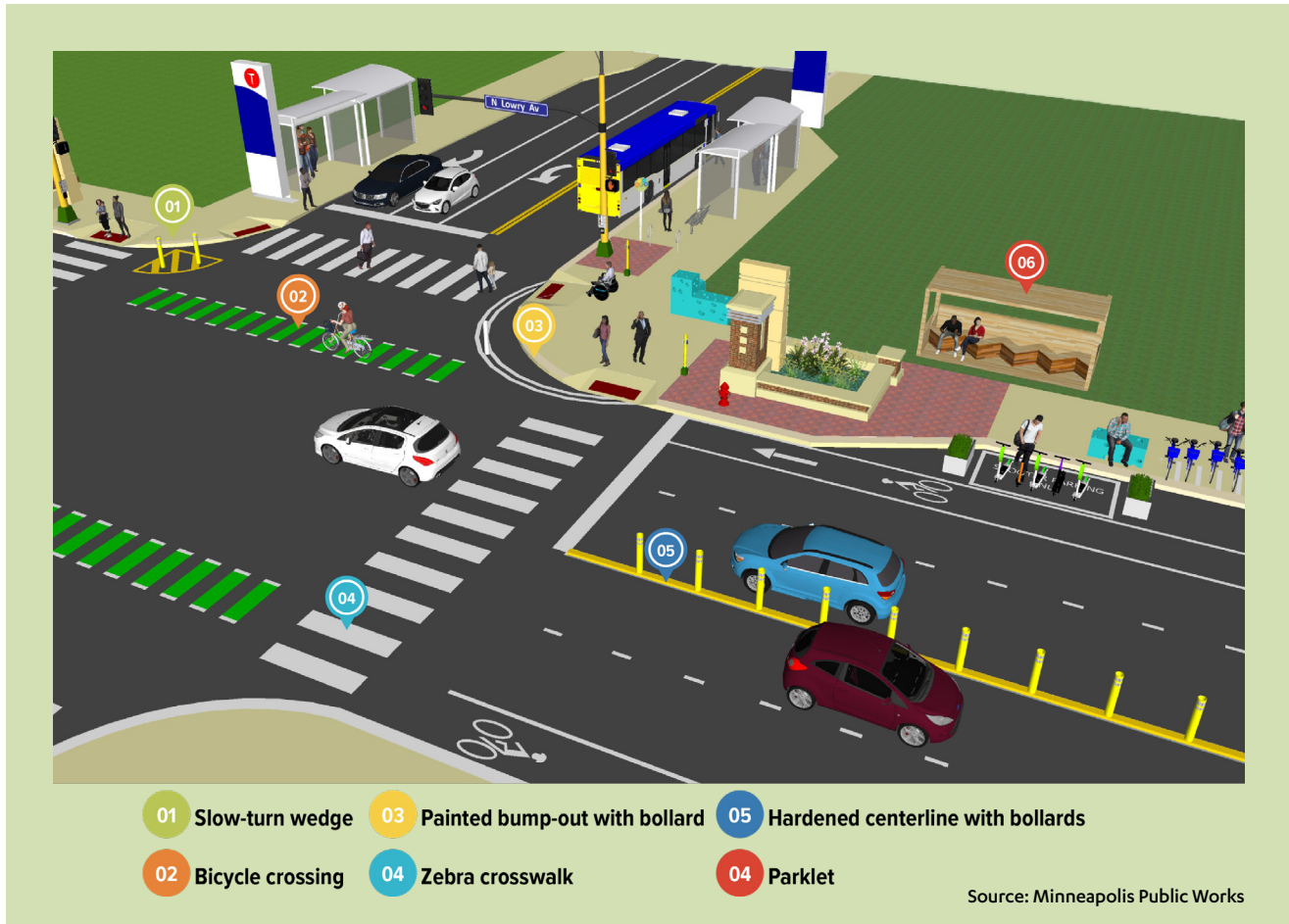
In 2020, the project team developed decentralized, community-based partnerships with neighborhood

organizations and business coalitions, as well as contracted on-site ambassadors to support engagement, maintenance, and safety. They launched an Ambassador Program to test a new model for the care of neighborhood-level infrastructure that focused on neighborhood resilience (Rasp et al, 2021).

Through in-person intercept surveys at events during the first year of implementation, the project team found that 64% of users reported the improvements encouraged more use of transportation options at hub locations, including micromobility (Rasp et al, 2020).

User feedback also led to intersection improvements at three hub locations in 2020, including bollard bump outs and hardened centerlines (Rasp et al, 2021). These changes were designed to increase visibility, lower the turning speed of turning motorists and reduce the distance pedestrians are in the roadway. The

Figure 3: ROADWAY SAFETY IMPROVEMENTS, MINNEAPOLIS



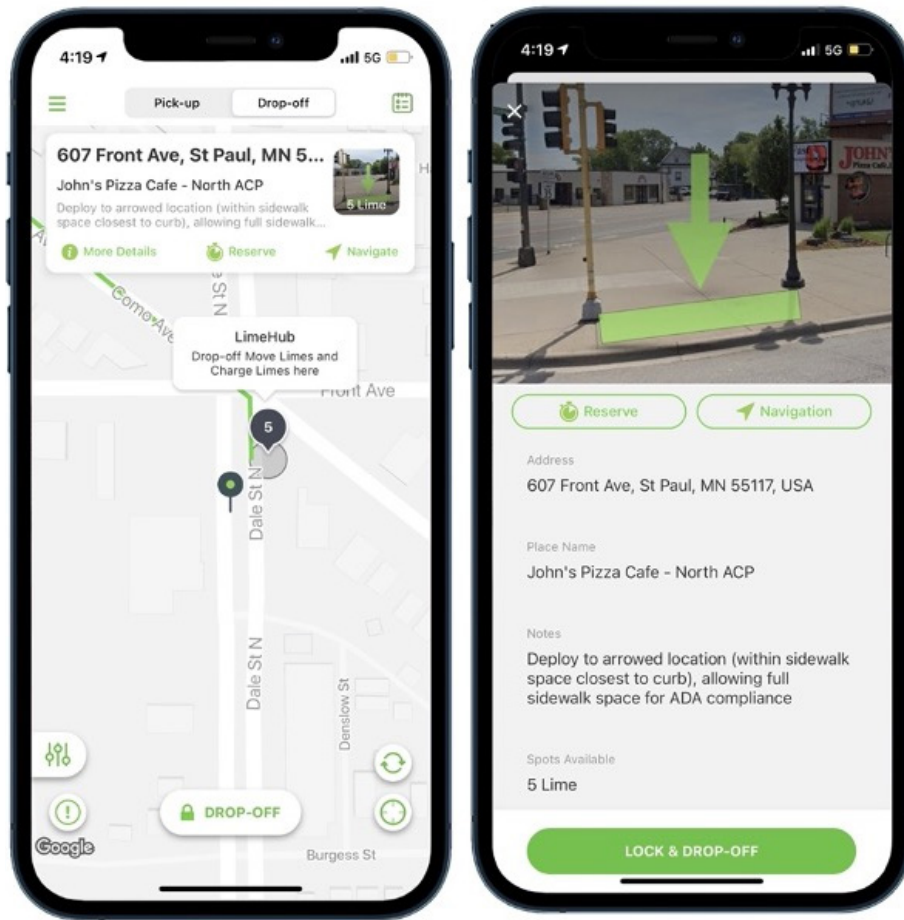
improvements enhanced safety for pedestrians and micromobility users (Rasp et al, 2021). See Figure 3.

During the 2019 pilot, limited sidewalk space was identified as a major challenge. As a result, protected on-street micromobility parking was incorporated into the 2020 hub program, using modular cubes as visual markers and physical barriers. This tactic relieved the pressure to fit all amenities and options in the limited sidewalk space, as well as encouraged on-street riding of micromobility (Rasp et al, 2021).

According to program manager Danielle Elkins, coordination and collaboration with the various mobility providers was essential to implementation (Elkins, interview, July 23, 2021). Micromobility companies Lyft, Lime, and Spin were active participants in the 2019 and 2020 hub pilots, from visioning through implementation and engagement (Rasp et al, 2020).

In addition to micromobility providers, the project team partnered with regional transit agency Metro Transit, Hennepin County, the Minnesota Department of Transportation, and public-private consortium the Twin Cities Shared Mobility Collaborative. A core goal of the pilot was identifying roadblocks and constraints to interagency right-of-way coordination (Rasp et al, 2020). Grant funding from National Association of Cities Transportation Official's Streets for Pandemic Response and Recovery Program supported the 2020 program (Rasp et al, 2021).

Elkins attributed the hub program as a significant factor in the accomplishment that more than 20% of micromobility trips were taken by low-income users or started or ended in an Area of Concentrated Poverty during the 2020 season (Elkins, interview, July 23, 2021).



Source: Lime

Lime Rebalancing System (Saint Paul)

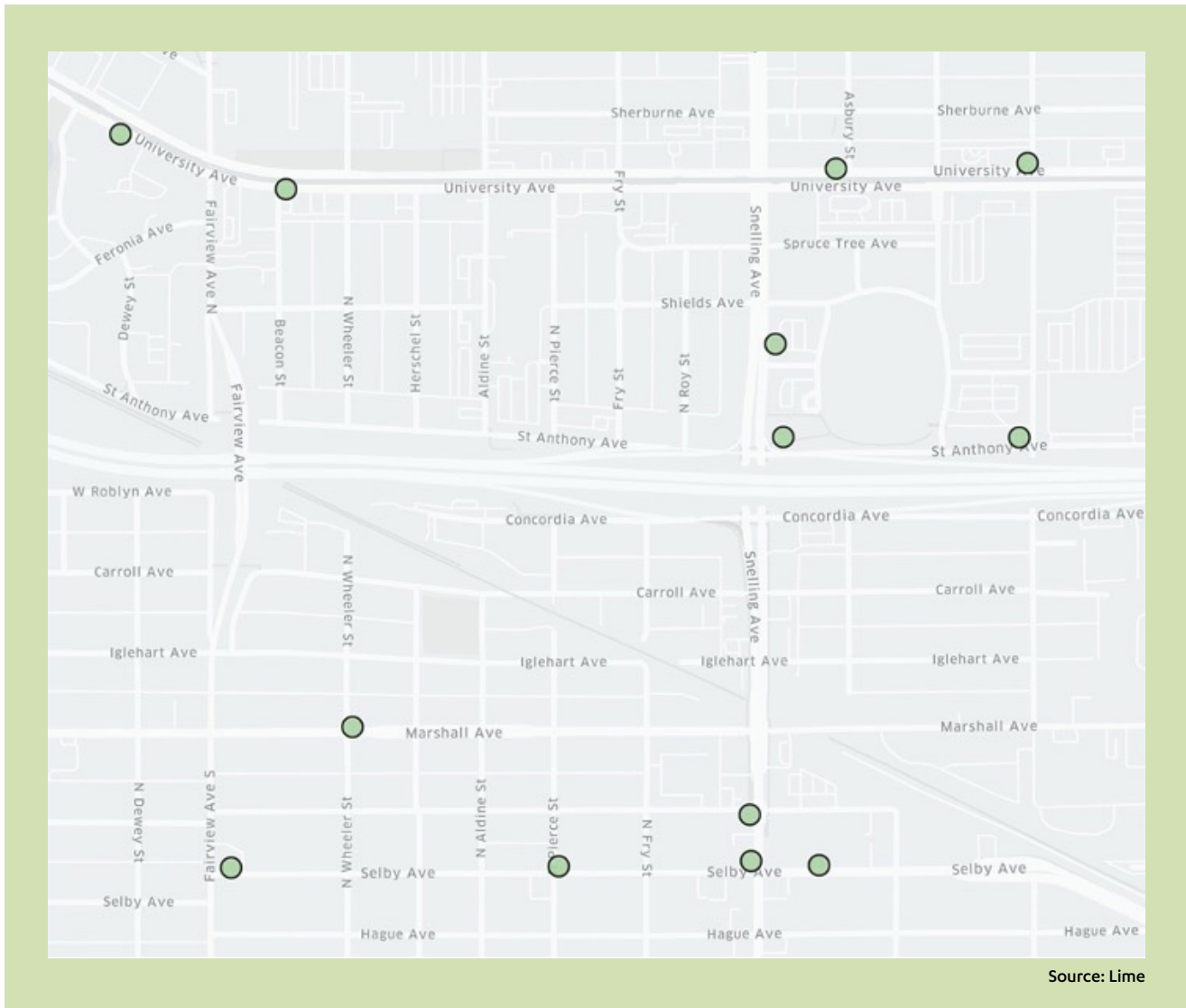
MICROMOBILITY PROVIDERS often view requirements for equitable deployment as the cost of doing business. But Lime’s rebalancing system is designed to create a win-win between profitability and equitable access.

To maximize use, Lime’s system uses predictive analytics to determine deployment locations with the highest likelihood to attract riders. This prioritization structure incorporates past trip data (by time of day and day of the week), population and job density, weather, and — importantly — mobility-disadvantaged communities designated by City of Saint Paul officials as underserved by transportation options (Cypher, interview, September 1, 2021). The system also prioritizes areas where users have opened the Lime mobile application but do not ride, which Lime attributes to the lack of a nearby vehicle. This “missed demand” feature adds these customers’ locations as potential deployment points.

Crew Cypher, director of global operations for Lime, noted that these locations are often in mobility-disadvantaged communities (Cypher, interview, August 5, 2021). While other providers use similar systems to identify daily deployments in the morning, Lime’s operational teams leverage this technology to constantly capture and redeploy scooters throughout the day.

This constant redeployment mitigates two common complaints from city officials. Program manager interviewees from multiple cities reported that providers often meet equity requirements by deploying the required number of scooters only along the borders between mobility-disadvantaged communities and more affluent areas. Another common compliance workaround is dumping multiple scooters in seemingly random areas of mobility-disadvantaged communities.

Figure 4: LIME DEPLOYMENT LOCATIONS IN AREAS OF CONCENTRATED POVERTY (2020) SAINT PAUL, MINNESOTA

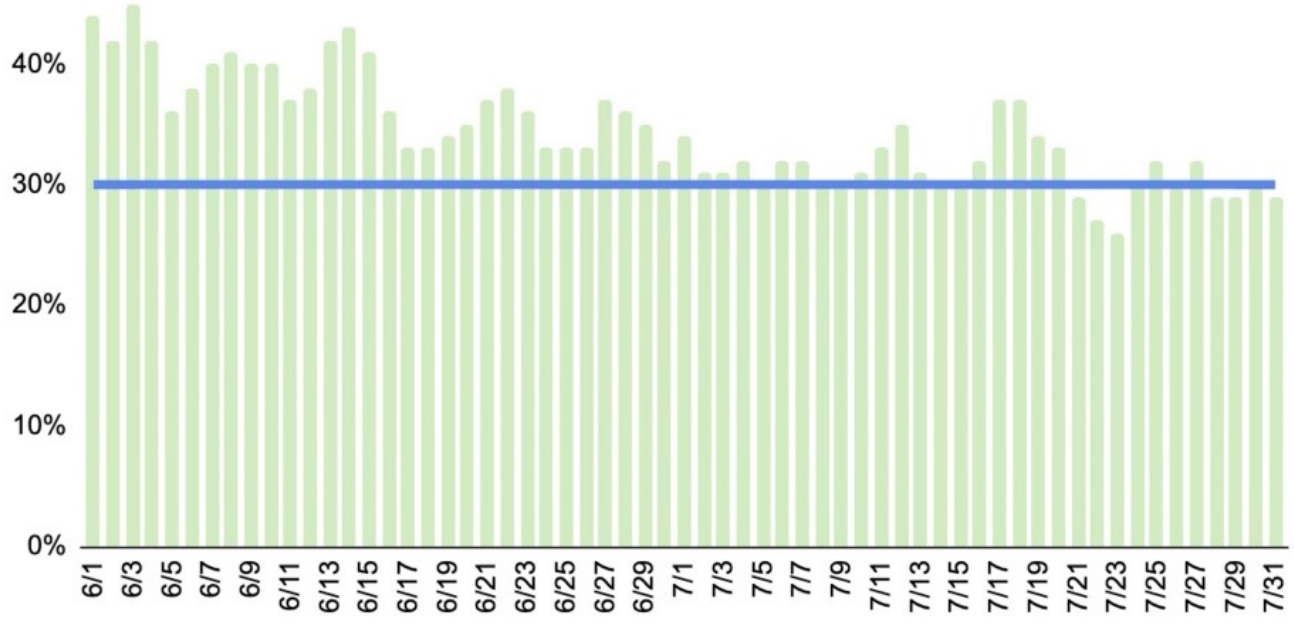


This strategy often results in the vehicles going unused and becoming a nuisance by obstructing sidewalks. In contrast to these negligent compliance strategies, Lime adjusts its deployment constantly to ensure ridership in equity zones is comparable with more affluent areas. Scooters are deployed throughout equity zones with over-deploys in the morning with the goal of maintaining an adequate proportion throughout the day (Cypher, interview, August 5, 2021). If a scooter remains unused for more than two hours, Lime’s system prioritizes the vehicle for redeployment in another area, typically in mobility-disadvantaged communities. As a

result of these features, one-third of trips begin or end in mobility-disadvantaged communities, on an average week (Cypher, interview, August 5, 2021).

According to Cypher, Lime’s system reflects an equity-focused redesign in 2020 in response to the Black Lives Matters protests. Along with profitability, Lime also sets internal equity metrics separate from city requirements. Cypher, who began his tenure at Lime as midwest regional manager and contributed to the redesign, stressed that “operators need to partner with cities to solve problems and meet city goals (Cypher, interview, August 5, 2021).”

Figure 5: PERCENTAGE OF LIME FLEET DISTRIBUTED IN SAINT PAUL AREAS OF CONCENTRATED POVERTY – JUNE & JULY 2021



Source: Lime

The success of Lime’s rebalancing system is exemplified in Saint Paul. While other providers in the city reduced vehicle deployments during the COVID-19 pandemic, Lime requested and was granted a 50% increase from 500 to 750 scooters in June 2020 (Collins, interview, June 28, 2021). The majority of these additional scooters were deployed in areas of concentrated poverty. Saint Paul’s program manager Reuben Collins noted that this equitable approach garnered trust between Lime and city officials. Collins appreciated that Lime’s

rebalancing system results in high use, including in areas of concentrated poverty, reducing resident complaints about idle scooters obstructing sidewalks. Collins complimented Lime on providing a real-time dashboard for his team to track enforcement, rather than providing raw data for the city to interpret. Given limited staff capacity, Lime’s dashboard and complaint-mitigating rebalancing practices are timesavers for monitoring compliance (Collins, interview, June 28, 2021).



Source: Lyft

Shared Micromobility Program - Parking (Denver)

In May 2021, the City of Denver Department of Transportation and Infrastructure began installing up to 675 parking stations for dockless scooters and bicycles over five years – fully funded and maintained by private providers (Denver, 2022). Many of these stations will be located in mobility-disadvantaged communities determined by the city's Equity Index, with both companies required to deploy a minimum of 30% of their vehicles in these areas (Denver, 2022; Herbert, 2021).

This focus on parking infrastructure arose in response to the closure of the city's nonprofit bike-share system, B-cycle, in early 2020. Due to constrained city funding, B-cycle was plagued by insufficient docking stations. Only five stations per square mile were installed, less than a fifth of the number recommended by the National Association of City Transportation Officials (Bosselman, 2019). The system was also criticized for the lack of stations in low-income neighborhoods (Bosselman, 2019).

Under the city's 2021 Shared Micromobility Program, the micromobility parking network doubled within the first year, from 89 B-cycle stations to 200 dockless parking stations (Denver, 2022). These stations include both signed parking corrals and vehicle racks in-street and on sidewalks. See Figures 6 and 7 for examples of sidewalk and in-street parking, respectively. At full build-out, the dockless parking areas are set to grow by seven-fold compared to the B-cycle docked bike-share system (Denver, 2022). Further, the number of micromobility vehicles grew from 716 to nearly 2,000 bikes and 6,000 scooters during 2021 (Denver, 2022). This robust bike-share system is tied to the city's requirement that providers offer bicycles equal to at least 20% of their scooter fleet (Denver, 2022).

Co-locating these micromobility stations with transit infrastructure is a program priority. The Denver Regional Transit District issued license agreements with the operators to allow access to its bus stops and train stations through its existing Transit Amenities Program

Figures 6 & 7: SIDEWALK PARKING CORRAL WITH SIGN AND IN-STREET PARKING ZONE (DENVER (DENVER))



Source: Lyft

(DOTI, 2021). The Shared Micromobility Program’s parking component is partially modeled after this program (Denver, 2022). Stephen Rijo, the city’s program manager, noted natural synergy between micromobility and transit (Rijo, interview, July 28, 2021). Rijo says city officials view “bike and scooter share [as] part of [Denver’s] transit system” (Rijo, interview, July 28, 2021).

To fulfill the commitment of a robust, rapidly scaling vehicle and parking program, the Department of Transportation and Infrastructure issued contracts with two companies, Lyft and Lime, respectively the largest bike-share and scooter-share providers in the U.S. Each company was granted an 18-month contract, significantly longer than offered in most other cities (Denver, 2022). The contracts are also renewable up to five years in order to see through the parking build-out. With these long-term contracts, city officials aimed to

build trust and a collaborative plan for micromobility infrastructure (Rijo, interview, July 29, 2021). The parking program equates to a \$15 million investment by the two companies (Rijo, interview, July 28, 2021). Lyft promotes Denver’s program as a model for other cities to achieve multimodalism (Lyft, 2021).

City officials are also doing their part to invest in making the micromobility system successful. The Department of Transportation and Infrastructure is installing 125 miles of bike lanes between 2020 and 2023. These lanes will primarily be installed in areas with low vehicle ownership and high transit ridership (Rijo, interview, July 28, 2021).

In just three years, Denver officials are poised to transform their city from having a defunct bike-share system plagued by inequity to a robust network of parking and dedicated lanes designed to serve mobility-disadvantaged communities.

RECOMMENDATIONS

BASED ON THE SUCCESSES and lessons learned from these programs, we offer the following recommendations for city officials, providers, and CBOs to improve affordability and infrastructure to benefit mobility-disadvantaged communities and travelers. Many of these recommendations reflect successful implementation methods as discussed above, as well as comments and recommendations by the interviewees. Other recommendations propose solutions to address recurring or widespread challenges shared during interviews, rooted in organizational barriers and lessons learned from the partnership models.

Affordability

1. Equity Program Redesign

Lead Partner(s): Micromobility providers

Compete for the best equity pricing program

Modeled after early bike-share programs, the equity pricing programs of most micromobility providers are due for a makeover. These programs must adapt to suit the needs of existing mobility-disadvantaged customers and attract new ones. Providers should reevaluate the structure of their equity pricing programs, including the pricing models – both the rates and/or number of complimentary rides – as well as the enrollment process.

These overhauls should be grounded in data. To determine prices, providers should use their ridership data from existing mobility-disadvantaged travelers (or collect this demographic data, if not already doing so) as well as data from mobility-disadvantaged communities, including trip frequency, distance, and costs. Providers should also engage CBOs, national experts with community organizing backgrounds, and potential customers, to improve the enrollment process.

In addition to reevaluating pricing and enrollment processes, providers should consider two affordability-related aspects of their broader equity approaches: memberships and low-tech payment options. Bikeshare providers, in particular, should move away from the legacy of requiring memberships to access equity pricing. As indicated in the research, auto-renewing

memberships discourage enrollment by mobility-disadvantaged travelers, particularly low-income people. Providers should continue to expand cash-based payment options, consistent with research indicating insufficient access to credit cards among low-income, BIPOC, and other mobility-disadvantaged travelers. Providers should build on their existing options to pay by debit and prepaid cards as well as account reloading through retail partners, a network that should be expanded to include community banks and credit unions with debit cards backed by no-fee checking accounts. City officials should require these cash-based options. CBOs could increase awareness of these options through engagement contracts with providers and/or city governments.

To hold providers accountable, city officials could encourage, if not require, providers to regularly review their equity programs and provide justification for maintaining or changing their structure. City officials should maintain a standard baseline of terms and benefits in their permitting requirements, to minimize confusion among mobility-disadvantaged travelers accessing multiple providers' equity programs. City officials could support improvements to equity pricing programs by reducing permitting fees or increasing vehicle caps, echoing Denver's approach. They could also foster competition for the best equity pricing program by rewarding the provider offering the lowest rates, registering the highest number of program participants, and/or attracting the most rides by program participants.

2. Community Engagement

Lead Partners: Cities, Providers, CBOs

Implement robust community engagement campaigns in mobility-disadvantaged communities to expand awareness of and participation in equity pricing programs.

Equity pricing programs are useless if mobility-disadvantaged travelers do not know about them. Awareness of these programs is a shared responsibility between city governments and providers. City officials and provider staff should directly engage low-income and BIPOC travelers to ensure they understand how to apply for discount memberships and rides. CBOs are essential partners in these efforts as they are trusted entities within mobility-disadvantaged communities.

City leaders – including elected officials and department leaders – should provide sufficient budgets and staff for micromobility program managers to actively participate in engagement activities. Several program managers discussed budget and time constraints due to expanding job responsibilities, project workloads, and oversight of providers of various shared vehicle modes. City leaders should dedicate at least one staff member exclusively to manage the city’s micromobility program. Preferably, the program manager will be part of a team assigned to manage citywide transportation planning and active transportation infrastructure installation as well as programs to streamline transfers between transit, micromobility, and other shared mobility services. Public information officers and other city staff involved in community relations should also be involved in engagement efforts.

City officials could specify minimum engagement requirements for providers and incentivize those that exceed these requirements. At minimum, these requirements should include the number of contacts in mobility-disadvantaged communities and at events geared toward those travelers, as well as the number of equity program applications and successful program enrollments. Program managers could also actively support provider staff in identifying engagement opportunities, including both existing events and potential locations for hosting standalone events.

Further, city staff should serve as conveners between providers and CBOs, to coordinate engagement activities as well as identify community leaders and other trusted public and private sector partners to participate in these activities. Program managers should invite other public-facing government staff, both internal to city government and from public agency partners such as transit agencies and metropolitan planning organizations, to participate in these engagement activities.

Provider interviewees – particularly local and regional managers responsible for compliance – expressed support for greater specificity in engagement requirements as well as incentives. They noted that clear expectations ensure that engagement programs align with city officials’ goals, which in turn supports good-faith negotiations for permit renewal. They also said that these requirements level the playing field between providers, creating an environment where they are both competing and cooperating to maximize engagement of mobility-disadvantaged travelers. Local and regional managers also shared that such requirements support their efforts to secure funds for engagement activities from their national corporate management.

These requirements should be the baseline for engagement plans, as required by Minneapolis and Oakland. City officials should encourage providers to offer innovative approaches to engaging mobility-disadvantaged travelers, fostering a culture of competition to develop and demonstrate best practices for engaging mobility-disadvantaged travelers. Program managers could require that all such goals and commitments are tied to measurable deliverables. While program managers should hold providers accountable to these commitments, they must also practice reasonable flexibility to allow providers to adapt plans as circumstances arise – as exemplified by the pandemic. For example, the Lyft Up partnership did not meet its original goals and program features, but the effort led to alternative opportunities, including the City of Oakland’s bicycle library and capacity-building among the CBO partners.

City officials and providers should also consider contracting directly with CBOs to conduct ongoing, in-person engagement. These contracts could take the form of a city-led ambassador program like in Minneapolis or coordinated by CBOs like in Oakland. Contracting with CBOs also supports their broader capacity-building, enhancing their ability to proactively provide feedback on equity programs to ensure that they fit the mobility needs of mobility-disadvantaged travelers.

As exemplified by Minneapolis' mobility hub program, city officials, providers, and CBOs could collaboratively host pop-up events at major transit stops and community gathering places like libraries, community centers, and predominately BIPOC-owned business districts. At these informal events, residents can learn about both general pricing discounts and each provider's equity pricing programs. Importantly, these events should meet people where they are, rather than expect them to spend time, energy, and money to travel to a location convenient to city officials or provider staff. Location selection could be guided by both data on mobility-advantaged areas – such as Minneapolis and Saint Paul's Areas of Concentrated Poverty – as well as CBO leader insights based on firsthand knowledge of community activities. CBOs can also promote events through community communication channels and word-of-mouth networks, as well as provide advice on where to invest in paid marketing. City officials and providers should compensate CBOs for their time and knowledge-sharing. While in-person events were placed on hold during the COVID-19 pandemic, it is time to resume these activities.

3. Multimodal Integration

Lead Partners: Providers, Cities

Design equity pricing programs that integrate multiple shared mobility services and support multimodal connections

Micromobility is ultimately only one part of the mobility ecosystem. To maximize the benefit of equity pricing programs, providers and cities should think holistically about affordable transportation for low-income and

BIPOC travelers. City officials and providers should integrate micromobility equity pricing programs with reduced-fare programs for mass transit, microtransit, ride-hail/ride-share, car-share, and other shared mobility services.

Multimodal integration begins with linking micromobility and transit. Micromobility is best suited for short trips, making it a prime transportation mode for filling first-last mile gaps. City officials should work closely with transit agencies and micromobility providers to integrate fare payment between these modes, including low-income discount pass programs. Move PGH's Universal Basic Mobility pilot offers a model for cities to center micromobility and transit to form a "mobility wallet" for mobility-disadvantaged travelers.

Next comes integration with transportation network companies offering ride-share/ride-hail services. As companies offering access to both ride-share/ride-hail services and micromobility vehicles, Lyft and Lime – through their Uber Technologies partnership – are well positioned to offer integrated equity pricing. City officials could incentivize these companies to integrate services through reduced permitting fees and increased micromobility vehicle caps. Meanwhile, city officials could also work with state regulators to refine transportation network companies' permitting to require integrated equity pricing. A combination of "carrots and sticks" may be most effective.

To fully integrate shared mobility services, providers and cities could follow the model of the Spin-led Pittsburgh Mobility Collective. Incorporating both public and private services, this multicompany partnership model maximizes modal choice and provides stopgaps for when and where micromobility vehicles are unavailable or inconvenient. Providers and city officials could collaborate to foster partnerships across companies specializing in each mode, including their equity pricing programs. Mobility-disadvantaged travelers should be able to apply through a single, unified process and receive ongoing communication about how to maximize each company's program.

Further, providers could offer an integrated fare

structure that allows travelers to pay a single price for their complete journey. For instance, a traveler could pay once for their scooter ride from their home to a bus stop, their transit fare, and their ride-hail trip from their final bus stop to their work site. This fare structure creates a seamless travel experience, of particular importance for mobility-disadvantaged populations facing technological knowledge barriers and encountering broader societal challenges and systemic racism. To enable multimodal payment, providers and city officials could embrace platforms such as Masabi's Justride, which powers the Move PGH's mobility wallet program. If providers are unwilling to integrate their payment systems with platforms such as Justride (or a comparable platform), city officials could require that their company-specific mobile applications integrate with the fare payment systems of public transit agencies and at least one company offering another mode type available in their city.

4. Umbrella Eligibility

Lead Partners: Providers, CBOs

Simplify equity pricing programs by integrating the enrollment process with existing social service programs or eliminate the application process entirely

To access an equity pricing program, mobility-disadvantaged travelers must be aware of the program, complete the application (typically using a computer with access to the internet), provide adequate documentation of eligibility (typically in an electronic format), wait for approval, and finally receive notification of approval through an email account or mobile application. This process can be unnecessarily arduous and ultimately discouraging for mobility-disadvantaged travelers.

Instead, providers should work with social service providers and transit agencies to pre-qualify eligible travelers for equity pricing programs. To protect the privacy of social program participants, micromobility providers could partner with city officials and CBOs to contact participants about their prequalified status. Danielle Elkins, Minneapolis' program manager, reported actively working with micromobility providers

and their partners to implement this "umbrella eligibility" approach. Shannon Delay of Spin said her company is working with affordable housing providers to integrate Spin's equity pricing program enrollment into housing providers' lease agreements. Both Elkins and Delay highlighted the importance of CBOs in implementing these strategies. CBOs are often actively involved in supporting low-income and BIPOC residents with enrollment in the social safety net, with transportation-related discount programs being among the newest and fastest evolving programs.

Alternatively, providers could automatically apply equity pricing using geofences, or virtual fences, around mobility-disadvantaged communities. Both Crew Cypher at Lime and Shannon Delaney at Spin discussed their companies' plans to implement this data-driven approach that eliminates the need for enrollment or qualification. Providers could actively seek insights from CBOs on defining these areas, supplementing available data. Ultimately, CBOs know their communities best and can offer guidance about data gaps and inaccuracies.

Infrastructure

1. Dedicated Lanes and Parking

Lead Partner: Cities

Expand active transportation-oriented infrastructure

With micromobility use increasing dramatically every year, it is time for cities to invest in both the quality and quantity of infrastructure that supports micromobility use.

These improvements include:

- » Installing micromobility parking zones and racks.
- » Expanding bicycle lane networks.
- » Updating conventional bicycle lanes and shared lanes into protected and buffered cycle tracks.
- » Providing intersection treatments, like bicycle signals and turn boxes.

Along with micromobility riders, these investments benefit pedestrians, transit users, and drivers by

reducing conflicts both on the street and along sidewalks. Cities should prioritize investments in mobility-disadvantaged communities and in areas with high levels of entry-level jobs often held by mobility-disadvantaged travelers, such as central business districts and suburban commercial centers.

Political will is a common barrier to city improvements. Program managers, provider staff, and CBO advocates should work together to provide sufficient data and build coalitions to convince political and department leaders to prioritize roadway redesigns and the installation of buffers and racks.

Ultimately, these investments require funding. Both city program managers and provider staff interviewed highlighted multiple ways to fund these improvements and prioritize their placement. Like in Oakland and Minneapolis, city officials could pursue state and regional grants in collaboration with their metropolitan planning organizations and state departments of transportation. In a less conventional approach, city officials could incentivize providers to directly invest in bicycle lane development and rack installation. Denver's program provides a model allowing providers to reduce their permit fees by paying for parking and other infrastructure elements. Alternatively, city officials can require providers to install charging stations for e-scooter and e-bikes, like in Pittsburgh.

Digital tools also provide a great opportunity for low-cost infrastructure improvements. City governments and providers can collaborate to designate parking zones for dockless micromobility using geofences. These parking zones – or “corrals” – are shown on mobile applications and designated by signs, decals, and/or paint to guide non-smartphone users. Compared to racks, these zones incur minimal installation and maintenance costs. City officials can further reduce costs by replacing physical docking stations with these dockless corrals. Similarly inexpensive, existing bicycle lanes can benefit from improved wayfinding signage of bicycle-friendly routes and regulatory notices targeted at drivers regarding the use of lanes by cyclists and scooter riders. Digital signage can be particularly supportive, according to several city staff interviewees.

City officials should take a data-driven approach to decide where to invest in these improvements, similar to Minneapolis' method of mobility hub siting. Beyond physical and demographic data available to the city, providers and CBOs can provide invaluable insights. Provider staff can offer user data, such as trip origin and end points and improper parking reports. CBOs can be resources for qualitative data including community gathering places, popular destinations, and areas of concern.

2. Deployment and Rebalancing of Vehicles in Mobility-Disadvantaged Communities

Lead Partners: Cities, Providers

Establish data-driven methodologies and systems for distributing micromobility vehicles that balance access for mobility-disadvantaged travelers and profitability for providers

City officials and providers should collaborate to determine equitable deployment strategies that move beyond these deployments as “the cost of doing business.” While affluent customers were early adopters, mobility-disadvantaged travelers represent a potentially lasting customer base. Low-income, BIPOC, and travelers with disabilities make up the majority of transit users. Further, low-income and BIPOC travelers have a long history of using personal bicycles as their primary mode of transportation. Mobility-disadvantaged communities also often have population density and street networks conducive to micromobility.

The approaches to micromobility deployment and rebalancing in the Twin Cities of Minneapolis and Saint Paul demonstrate best practices by city officials and providers respectively. City officials could implement a data-driven strategy like Minneapolis' Equity Distribution Compliance Methodology. Metropolitan planning organizations are invaluable partners in collecting and analyzing the demographic data upon which these strategies are based. Further, program managers should regularly monitor vehicle availability in mobility-disadvantaged communities with fleet management platforms, like Populus and Remix. This software can support program teams in aggregating information,

so that program managers can evaluate the equitable deployment practices of providers.

Similarly, providers should follow Lime’s lead of actively monitoring trips beginning and ending in mobility-disadvantaged communities and regularly rebalancing vehicles to maximize trips in these areas. This ongoing rebalancing has the added benefit of minimizing the time that improperly parked micromobility vehicles obstruct sidewalks. Relying purely on deployments in high-traffic areas is a short-sighted, unsustainable business model that leads to inequitable distribution of micromobility vehicles in many cities. City officials should reward providers that pursue active rebalancing strategies by increasing vehicle caps, to ensure that an appropriate proportion of their fleets are available for deployment in mobility-disadvantaged communities. The mutually beneficial relationship between Lime’s operational team and the Saint Paul program team exemplifies a public-private partnership that centers both equity and profitability.

3. Multimodal Integration

Lead Partners: Cities, Providers

Invest in pedestrian-oriented infrastructure that supports safe travel and facilitates seamless transfers between micromobility vehicles and other shared mobility services

As with affordability, micromobility systems cannot thrive in isolation. Providers and cities should think holistically about the journey of mobility-disadvantaged travelers. Micromobility vehicle deployments and transportation facility development should support co-location of shared mobility services to empower mobility-disadvantaged travelers to choose the shared mobility option that best fits their needs.

City governments and providers should install docking stations, vehicle racks, and dockless vehicle corrals near transit stations and popular ride-share/ride-hail pickup and drop-off locations. While providers often promote their services as first-last mile connectors, they should work collaboratively with city governments and transit agencies to install the physical assets that actively encourage transfers between single-rider

micromobility vehicles and multipassenger services like transit and ride-sharing. Providers should also work with cities to install physical and digital signage that promote transfers between modes. Providers can install signage inexpensively and rapidly, laying the foundation for future larger-scale improvements by boosting the number of trips that originate or end at these multimodal locations.

City governments should also invest in right-of-way improvements, like slow lanes and mobility hubs, in mobility-disadvantaged communities and near destinations frequented by mobility-disadvantaged travelers, such as central business districts and suburban job centers. Modeled after cycle tracks, slow lanes can promote safe travel by personal and shared first/last mile modes – bicycles, scooters, microtransit, and ride-hailing/ride-sharing – by separating shared mobility users from drivers. City governments could install these lanes along collector streets that connect to dedicated transit lanes on major arterials. These lanes can attract increased ridership on all shared mobility services, as users enjoy a level of convenience competitive with driving a personal car. These lanes can be installed and maintained through cost-sharing with providers, or transit agencies and municipalities could leverage lane access to persuade providers to share data. Through mutually beneficial agreements, public and private providers can enhance route planning and scheduling to improve the travel experience of mobility-disadvantaged travelers.

Mobility hubs support off-street connections by creating centralized locations where travelers can safely and easily transfer between modes. Cities should model their mobility hubs after Minneapolis and Pittsburgh. Both cities’ programs center micromobility by adding protected micromobility vehicle parking near bus stops and pickup/drop-off areas for ride-hail/ride-share services. Providers should be active participants in the siting, design, and construction of mobility hubs. Like Minneapolis and Pittsburgh’s program teams, cities should work with providers to determine what infrastructure improvements are needed to maximize ridership to and from hubs. Cities should require micromobility companies to prioritize

vehicle deployments at the hubs and participate in community engagement activities. CBOs should also be deeply involved in every stage of hub development. Minneapolis' siting and engagement strategy is the model for these CBO partnerships. Like Minneapolis, cities could consult CBOs in determining where to construct hubs, as these organizations offer qualitative insights that quantitative data may not reveal. City officials could also consider contracting with CBOs to conduct community engagement and maintain sites like Minneapolis' Ambassador Program. At full build-out, mobility hubs offer the highest level of physical multimodal integration.

Cities should consider contracting infrastructure improvements to providers. All provider interviewees emphasized their willingness to directly invest in roadway improvements. Denver is the only program to pursue this option by allowing providers to contribute toward infrastructure in-lieu of permitting fees, with the potential for direct installation by the providers in the future. Through Move PGH, Spin and Swiftmile are leading the development of small-scale mobility hubs consisting of a charging station and information kiosk. The Lyft Up partnership also included funding for the installation of bicycle racks. While city program managers may be hesitant to allow nongovernment personnel to directly install elements in the public right-of-way, most micromobility providers have experience in right-of-way installations in the form of bike-share stations.

In addition to infrastructure improvements, city officials should consider supporting multicompany partnerships. An exclusive model like Move PGH can be a win-win for cities and providers. City officials can more easily regulate a single provider per mode and benefit from a single operational leader that serves as a primary point-of-contact and responsible party for ensuring all companies meet their equity requirements. Providers maintain a monopoly on their mode, allowing them to maximize their profit and redistribute a portion of that profit into infrastructure improvements that directly benefit micromobility service in mobility-disadvantaged communities. Of note, these exclusive partnerships could create a risk of the entire shared

mobility ecosystem failing if a provider – particularly the partnership leader – fails. City officials should choose their primary partner wisely and set requirements for the timeline and structure of exit strategies for each modal partner. Conversely, cities could achieve similar goals by requiring all micromobility providers to share data on ridership patterns, either citywide or specifically in mobility-disadvantaged communities. City governments, providers, and CBOs can use this data to determine where to prioritize deployments and upgrade infrastructure. However, this approach may face provider pushback, due to concerns about user privacy and competitive advantage.

4. Community Engagement

Lead Partners: Cities, Providers, CBOs

Actively seek input from mobility-disadvantaged travelers on barriers to adoption, including vehicle designs, deployment strategies, and right-of-way improvements

City officials and providers should design infrastructure in partnership with mobility-disadvantaged travelers. Similarly, providers should engage these travelers to determine whether vehicle offerings and deployment locations suit their travel needs. CBOs are invaluable partners in community engagement as trusted, local entities.

As outlined in the Affordability section, city leaders should provide sufficient resources for micromobility program managers to actively participate in engagement activities around deployment strategies and infrastructure investments. City leadership should have a dedicated staff member assigned to manage micromobility and participate in internal discussions about curb management and roadway designs. These resources include engagement budgets and specific responsibilities that include seeking and following up on feedback on multimodal infrastructure in mobility-disadvantaged communities. Being seen in these communities is an important element of building trust with mobility-disadvantaged travelers.

Again, program managers and other city officials should serve as conveners between providers and CBOs to

discuss potential coordinated engagement activities as well as identify community leaders and influencers and other trusted public and private sector partners to participate in infrastructure planning. Program managers should invite other public-facing government staff, both internal to the city and from public agency partners, such as transit agencies and metropolitan planning organizations, to discuss infrastructure investments.

City officials and providers should also consider contracting directly with CBOs to conduct ongoing, in-person engagement. These contracts could take the form of a directly managed program like Minneapolis' Mobility Hub Ambassador Program or coordinated independently by the CBOs like in Oakland. Contracting with CBOs also supports their broader capacity-building, enhancing their ability to provide feedback on infrastructure changes and improvements.

As exemplified by Minneapolis, city officials, providers and CBOs should collaboratively host pop-up events at major transit stops and community gathering places like libraries, community centers, and predominately BIPOC-owned business districts. Importantly, these events should meet people where they are. At these informal events, residents can test vehicles and provide feedback on where to install docking stations and deploy dockless vehicles. Location selection should be guided by both data on mobility disadvantaged areas as well as CBO insights based on their firsthand knowledge of community activity. CBOs can also support these activities by promoting them through their communication channels and word-of-mouth networks, as well as guiding city officials and providers on where to invest paid marketing about these events. City officials and providers must compensate CBOs for their time and knowledge-sharing.

CONCLUSION

WITH RAPIDLY EVOLVING MICROMOBILITY SYSTEMS, there is an opportunity to establish more equity-focused transportation programs by creating public-private partnerships and coordinating with community-based organizations.

The programs in these five mid-sized cities demonstrate the potential for collaboration to achieve equity in terms of both affordability and infrastructure. Based on our findings, we recommend these partnerships center on community engagement and multimodal integration. Providers have a responsibility to consistently evaluate and redesign their equity pricing programs and deployment strategies. City officials should focus on expanding safe riding infrastructure through dedicated lanes and sidewalk infrastructure to reduce physical barriers to micromobility vehicle access. CBOs should be central to planning and program implementation, as experts in their communities and trusted ambassadors. City officials and providers should invest in such partnerships with CBOs to achieve community-driven planning and system operations. These multiparty partnership models are particularly important for designing and evolving micromobility systems in mid-sized cities.

While we strove to incorporate best practices from around the country, further analysis is needed to comprehensively characterize successes and lessons learned as well as recommendations on how to increase

ridership. As a fairly new mode of transportation – and given the societal impact of the COVID-19 pandemic – micromobility systems are rapidly evolving. Interviews took place during the early stages of several programs, and city officials and providers could benefit from further analysis of program outcomes.

Data-management practices was a recurring theme across conversations with city and provider staff but was outside the scope of this project. The New Urban Mobility Alliance, the Shared-Use Mobility Center, and the Open Mobility Foundation are leading the way on data management practices. City officials and providers should continue to work toward common practices for data sharing. These efforts are critical to improve equitable distribution of micromobility vehicles and improve multimodal integration.

Micromobility provides unprecedented opportunities to improve equitable outcomes for mobility-disadvantaged travelers and their communities. As city officials and providers seek to improve micromobility systems, the voices of these travelers should be central to program design and implementation.

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APPENDIX

REPORT INTERVIEWEES

Organization	Interviewee	Title
511 Contra Costa	Kirsten Riker	Project Manager
511 Contra Costa	Corinne Dutra-Roberts	Senior Transportation Analyst
ActiveSGV	Carly Curiel	Community Engagement Specialist
ActiveSGV	Edward Duong	Community Engagement Manager
City of Austin, TX	Mary Vo	Transportation Supervisor
City of Austin, TX	Andrea Martinez	Mobility Demand Management Program
City of Denver, CO	Stephen Rijo	Senior City Planner
City of Minneapolis, MN	Danielle Elkins	Mobility Manager
City of Oakland, CA	Kerby Olsen	New Mobility Supervisor
City of Pittsburgh, PA	Karina Ricks	Director, Department of Mobility and Infrastructure
City of Pittsburgh, PA	Tosh Chambers	Senior Program Director, Move PGH
City of Saint Paul, MN	Reuben Collins	Transportation Planner/Engineer
Contra Costa Transportation Authority	Peter Engel	Director of Programs
Lime	Crew Cypher	Head of Global Operations
Lime	Eric Kocaja	General Manager, Mid-South
Lime	Lee Foley	Director, Government Relations - Midwest
Lyft	Chet Ridenour	Senior Operations Manager (background only)
Manchester Citizens Corporation	LaShawn Burton-Faulk	Executive Director
Metro Transit	Meredith Klekotka	Shared Mobility Program Manager
Mobilify Southwestern Pennsylvania	Chris Sandvig	Executive Director
San Gabriel Valley Council of Governments	Caitlin Sims	Manager of Local Programs
Spin	Shannon Dulaney	Head of Community Partnerships, North America
Superpedestrian	Sharon Zhang	Senior Manager, Policy & Business Development
Superpedestrian	Jamie Perkins	Director of Communication
Superpedestrian	Paul White	Vice President, Public Policy
TransForm	Clarrissa Cabansagan	Director of Programs