



On the Horizon: Planning for Post-Pandemic Travel

November 2021



AMERICAN PUBLIC TRANSPORTATION ASSOCIATION



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Executive Summary

Transit agencies played an essential role in ensuring the mobility of Americans during the COVID-19 pandemic. Faced with a challenging environment, agencies operated buses and trains day in, day out, moving millions of people, especially essential workers who kept society going even at the height of the health crisis. Even though agencies experienced a dramatic loss of riders during the pandemic, they were resilient and creative in moving forward. With good planning, effective operations, and strong communication, they can adjust their services to attract more riders.

To evaluate transit agencies' responses to the pandemic and their future plans, we collected data from operators, deployed a nationwide survey of staff, and conducted detailed case studies of five agencies. We amassed information on how demographic, employment, and travel trends may change in the coming decades. Finally, we developed recommendations for agencies to leverage best practices to ensure their ability to provide equitable access to mobility in the coming decades. Our major findings:

Pre-Pandemic Trends Gave Transit Agencies Reason to Be Optimistic, But Challenges Remain

- City centers, where transit functions most cost effectively, were attracting an increasingly educated and wealthy population, although many urban neighborhoods remain entrenched in poverty. At the same time, regional growth patterns encouraged people to work farther from home. Families with low incomes were increasingly living in communities far from transit.
- After a growth spurt, national transit ridership began to fall in 2015 as driving increased. Competition from ride-hailing services, difficulties attracting new riders, and failure to retain riders tired of inadequate bus and train service limited agencies' ability to expand their customer base in some areas. Other agencies were able to grow ridership with improved service offerings. There were some signs that this nationwide trend was reversing in the period just before the pandemic – transit ridership in the US grew significantly in December 2019, as well as in January and February 2020.

The Pandemic Led to an Increase in Remote Work, and Transit Agencies Lost a Large Share of Their Users

- At the beginning of the pandemic, telecommuting increased dramatically, leaving offices empty. Although some urban residents moved to suburban or rural communities, the evidence that this trend will continue is limited.
- In spring 2020, transit agencies nationwide lost many riders, to a large degree because of telecommuting. Although road use also declined, traffic had returned to pre-pandemic levels by summer 2021, including at rush hour; use of buses and trains did not pick up as rapidly.



Agencies Responded in Different Ways to the Pandemic, Some More Successfully Than Others

- In response to falling ridership, difficulty retaining enough staff members, and concerns about finances, most transit agencies cut service. But the GRTC Transit System in Richmond, Virginia, one of our case-study systems, mostly avoided service reductions. GRTC eliminated fares and reoriented service to local bus routes to prioritize essential workers and social equity. Likely because of these choices and the Richmond region's demographics, GRTC managed to recoup most of its ridership. This was not the case for the other agencies we studied.
- Agencies developed approaches to handling pandemic challenges. The Port Authority in Pittsburgh quickly convened a response team that ensured the system could maintain effective service throughout the pandemic. All agencies emphasized employee and rider safety, such as by improving cleaning protocols, working with unions to develop programs for sick employees, securing operator space on buses, and providing free masks. Spokane's STA, for example, gave paid time off to all workers to receive COVID-19 vaccine doses.
- During the pandemic, agencies struggled to attract new workers and address material shortages. Higher private-sector wages made attracting new employees more difficult, limiting agencies' ability to keep buses and trains running and clean. However, they used overtime to compensate.
- Some agencies, such as the Port Authority in Pittsburgh, expanded service to communities where many people of color and families with low incomes live. Along Regional Transportation District routes in Denver, these communities continued to ride transit in large numbers.

- To ensure the public was kept abreast of changes to transit service, agencies expanded communication with the public. Los Angeles' Metro system, for example, reinforced its social media campaigns and signage, while monitoring customer feedback in real time.

A Post-Pandemic Future Offers New Possibilities for Transit Operators, but in an Evolving Context

- Interest in living and working in dense, transit-friendly communities is likely to continue post-pandemic. Public transit agencies have an interest in ensuring cities accommodate a diversity of residents, particularly people of color and families with low incomes, through expansion of available affordable housing near public transportation.
- Higher levels of telecommuting are likely to persist, which could lead to both negative and positive outcomes for transit agencies. On the one hand, the demand for transit in urban centers, on which transit operators have historically relied, could be permanently reduced. On the other hand, opportunities to serve people who have not previously used transit may arise.
- Transit agencies can seize the opportunity to better serve people who continue to need access to mobility, such as people who work in manufacturing facilities, students, health care professionals, and people with low incomes.

Transit Agencies Should Execute Key Changes in Operations and Planning to Adapt to New Realities

For transit agencies, success can take many forms: increasing ridership, guaranteeing an equitable and just level of access for the most vulnerable members of society, helping to ensure a sustainable transition away from a carbon-emitting society. The choices transit agencies make can help determine whether pre-pandemic trends are reinforced or reversed. There are four overarching recommendations the industry can incorporate into planning and operations:

Institutionalize Best Practices from the COVID-19 Period

- **Develop improved partnerships with labor.** Transit agencies faced challenges keeping staff coming to work, not only because of the health emergency, but also because of increasing wages offered in the private sector. Nevertheless, agency management improved relationships with workers over 2020 and 2021. First, agencies with unions identified key areas of agreement on creative ways to redeploy manpower in the face of material and staff shortages. Maintaining these collaborations can help ensure employees are engaged and do not feel that changes are being undertaken out of nowhere. Second, agencies improved their day-to-day communications with staff. This included the creation of Facebook messaging and texting channels that allowed managers to better understand which staff members were available and what needs they had. The combination of formal and informal approaches to seeking feedback can improve responses to sudden changes.

- **Offer better community engagement.** The pandemic initially shut down public engagement as agencies scrambled to respond to the crisis. As the pandemic continued, however, transit organizations developed new approaches to working with the public. All agencies increased public communications. Operators expanded outreach through virtual meetings, helping ensure that residents continued to be able to participate in decision making. Better engagement can also identify community needs. Spokane Transit Authority, for example, learned that it needed to improve access for older adults. It then reassigned paratransit vehicles to help older adults access health care, recreation, and other needs. Transit agencies should reinforce similar efforts in the years to come.
- **Ramp up hiring for more operators and mechanics.** Because of rapidly increasing private-sector wages, agencies may have to find ways to increase pay beyond what was previously considered reasonable for these types of occupations. They must develop strategies to attract trainees through operator and mechanics courses, which are pipelines for future employees but shrank during the pandemic. Agencies must also work with state governments to allow commercial driver's permitting and licensing on-site, as GRTC did. Agencies should highlight the positive aspects of working in the public transportation industry, such as job stability, good benefits, and union membership.
- **Develop new efforts to address potential future materials shortages.** Officials may consider assessing and quantifying the materials needed to keep buses and trains running and establish an approach to warehousing enough materials to allow agencies to maintain service for several months without additional purchasing.
- **Expand sanitation measures.** Early in the pandemic, public health authorities claimed that people could contract COVID-19 from touching surfaces and recommended considerable cleaning. Transit agencies responded by expanding cleaning protocols, including with midday shifts and temporary staff. More recent evidence shows that the disease is unlikely to be spread by touch, and that ventilation (which agencies also invested in improving) is more important. Nonetheless, more frequent cleaning improved the customer experience, making riders feel more welcome on board. Agencies should expand their sanitation measures primarily with the goal of ensuring higher ride quality.

Plan and Operate More Effectively by Prioritizing Social Equity

- **Redefine transit success beyond just transit ridership.** Interviewees from the five case-study agencies emphasized that the pandemic and the Black Lives Matter movement had altered their perceptions of why they were providing transit service in the first place. According to officials at the Port Authority of Allegheny County, for example, the agency learned it needed to think of transit less as a business but more as an essential service that provides high-quality rides for everyone who uses it. For agencies looking for inspiration, that means finding ways to ensure that even the most marginalized members of society have access to reliable, convenient, affordable, and fast ways to get around, not necessarily focusing on improving service for the most people or for the most privileged.
- **Identify people and communities that have faced, and continue to face, inequitable access to opportunity.** Making progress toward socially equitable transit access requires identifying which people and communities are most vulnerable to lack of transit access, and whose livelihoods would be most

improved by expanding service. Conducting such an investigation requires detailed mapping of current access to opportunity, such as to jobs, recreation, schools, and health care, within transit service areas. It requires identifying differences in access times by different modes of transportation, and differences in people's access based on the mode they use, such as by transit or by car. Finally, it requires agencies to identify where jobs are located—particularly for families with low incomes and people of color. This baseline evaluation is necessary not only to meet federal Title VI civil rights requirements, but also to aid agencies in identifying how to reorient service and investments.

- **Reallocate resources toward vulnerable people, underserved neighborhoods, and essential workplaces.** Harnessing evidence offered by a systemic access analysis, transit agencies should work to ensure that bus and train service best serves the communities that most need better access to transportation. This effort can take several different forms. One approach could be to alter the balance between the hub-and-spoke network that characterizes most US transit systems now and a network that allows neighborhood-to-neighborhood access. This new approach could respond to changing commuting patterns and create better options for people who do not work in downtowns.
- **Consider adapting services to different needs on different days of the week and different times of the day.** Making bus and train options that work for people all day, including late and night and on weekends, is essential for ensuring connectivity. If ridership is less concentrated at the peak than it once was, transit agencies may save money by being able to reallocate resources to better service all day.
- **Harness these same lessons to improve capital planning programs.** New bus rapid transit lines and rail routes will continue to play an important role for transit agencies; indeed, with new federal funding, there may be more money than ever to invest in them. But capital projects must emphasize the needs of families with low incomes and people of color—particularly those living in communities with relatively poor access to opportunity—so outcomes can be linked to the goal of building social equity. In some cases, this should mean piloting service to suburban job centers or to dense, relatively high-poverty urban communities.
- **Realign existing services to best meet the needs of the traveling public.** Our research demonstrates that the pandemic affected public transportation services in different ways. Local bus services—particularly those that provide access to communities with high numbers of essential workers and families with low incomes and people of color—maintained much of their pre-pandemic ridership, suggesting their continued importance. On the other hand, express bus options and commuter rail services suffered significant reductions in demand. Public transit agencies should learn from this experience and align service patterns to best meet the needs of the traveling public.
- **Provide opportunities for meaningful involvement in decision making by all.** Expanding social equity means giving the public opportunities to participate in decision making related to the planning and operations of transit agencies. The agency staff we interviewed emphasized that the pandemic offered opportunities to expand outreach through virtual engagement. These mechanisms, combined with renewed in-person processes, can help agencies learn what is working well and what is not. In some cases, agencies must build on their current approaches in order to ensure adequately representative participation. Examples include paying participants with low incomes for their time, partnering with trusted community groups, and weighting surveys for population representativeness to make up for gaps in participation.

Leverage Opportunities to Expand Ridership

- **Focus on opportunities to make transit a good choice for everyone.** This requires agencies to not sit back and wait. Making transit more attractive to more people could mean lowering barriers to access, such as a lack of information about how to ride. One transit agency CEO we interviewed said, “our theory is that people don’t have to marry us; they can just date us.” Staff pointed out opportunities for increasing the public’s understanding of how to ride transit. The Port Authority of Allegheny County showed off a bus at a car show. At RTD, staff partnered with businesses to carry attendees to downtown events, which had the net benefit of also bringing people downtown during the pandemic. These approaches allowed people unfamiliar with transit to understand what it was like to use it.
- **Identify potential fare payment improvements and discounts.** One official noted that many people do not know how to pay for transit. The agency is investigating working with a utility company to distribute fare cards to all customers along with billing statements. Transit agencies should also consider identifying new fare discounts aimed specifically at riders who may be ready to jump on if given the opportunity. Los Angeles Metro, for example, is piloting free passes for children, which could develop a future transit market. Spokane Transit Authority is considering working with downtown apartment managers to provide transit passes to tenants as an incentive for living in certain units.
- **Increase efforts to link transit service with equitable transit-oriented development.** This is essential because ridership is dependent to a large degree on the presence of workers and residents adjacent to transit lines. Transit agencies can partner with developers to coordinate planning new projects that are located along bus and train routes and provide easy walking access to them. Agencies should acknowledge that in some cases, the most effective sorts of transit-oriented development are those that provide affordable housing, since low- and moderate-income residents are more likely to ride buses and trains than their higher-income counterparts.
- **Develop engaged, long-term relationships with other governmental actors.** Federal, state, and local governments must identify new funds to aid transit agencies in expanding access to mobility for all. Local governments could work with agencies to build bus and train ridership. To encourage dense new housing near transit stations, they can reform zoning ordinances, including by reducing parking requirements and allowing more housing units per lot. And they can redesign streets to prioritize pedestrians in order to make neighborhoods more welcoming for people walking to the bus or train.

Keep Abreast of Changing Trends

- **Respond to changing telecommuting trends.** Public transit agencies can reconsider certain types of services, like peak-of-the-peak services, if increasing numbers of workers are telecommuting. Expanding neighborhood services can help serve mid-day trips taken by telecommuters. Conversely, if telecommuting rates return to pre-pandemic levels, transit agencies can reinforce core routes to downtowns in order to keep up with the growth of in-person jobs.

- **Respond to increases in automobile traffic.** Growing levels of congestion could be an opportunity for transit agencies to demonstrate their value in offering riders an escape from hours of commuting by car. Agencies must carefully calibrate schedules to match realistic travel times for buses stuck behind cars, and work with local governments to expand bus-only travel corridors.
- **Plan for changes in market demand in central-city areas.** Increased investment in central areas can be good news for transit agencies in that it hits their core market. In order to combat gentrification and displacement that impacts local transit users, public transit agencies can work with local governments and housing developers to increase the amount of affordable housing constructed adjacent to transit stations to create a built-in ridership base. On the other hand, declining demand could be difficult for transit agencies—but also offer opportunities to enhance accessibility for families with low and moderate incomes who are newly able to afford living near bus and train service. Agencies can work to ensure continued good service to such communities to guarantee equitable access to mobility.
- **Plan for increased development in suburban communities.** Budding growth in suburban residential and employment environments should be associated with new transit service, especially in line with growth in communities with high shares of residents who have low incomes and are people of color. This may require negotiations with local governments to identify new funding to account for growth, as well as partnerships with developers to ensure that new construction is designed in a fashion that accounts for the needs of transit users.
- **Respond to concerns about spreading infection.** If the public continues to be concerned about potential infection from COVID-19 or future pandemics, transit agencies must respond attentively. First, they must show a continued focus on cleanliness, while emphasizing the use of masks or other personal protective equipment. Given the low cost of surgical masks, transit agencies should consider distributing them for free on all buses and trains. Second, the public transportation industry must work with public relations firms and the media to continue spreading the accurate message that transit is not a proven vector of disease, and passengers should feel comfortable using public transportation.

Introduction

The world came to a halt in spring 2020 as the COVID-19 pandemic hit the United States, infecting thousands and overwhelming health care systems. On April 12, as offices shut down and schools went virtual, fewer than 200,000 trips were taken on the New York Subway—that is less than 5 percent of typical weekday ridership before the pandemic and might be the lowest daily figure in decades.¹ New York was not the only city affected. Nationwide, transit agencies saw their ridership numbers plummet, and many wondered how to provide services safely for their customers and their workers.

The pandemic has also been a time of social change. In summer 2020, motivated by the killing of Black people like George Floyd and Breonna Taylor, millions of Americans took to the streets to push for social and racial justice. People expressed solidarity with essential workers—the people working in hospitals, staffing grocery stores, and picking up trash—by donating to special funds or hanging window signs. The federal government provided benefits for millions of people who were suddenly unemployed. And transit agencies kept on moving, ensuring that millions of people nationwide could get to work and meet their day-to-day needs.

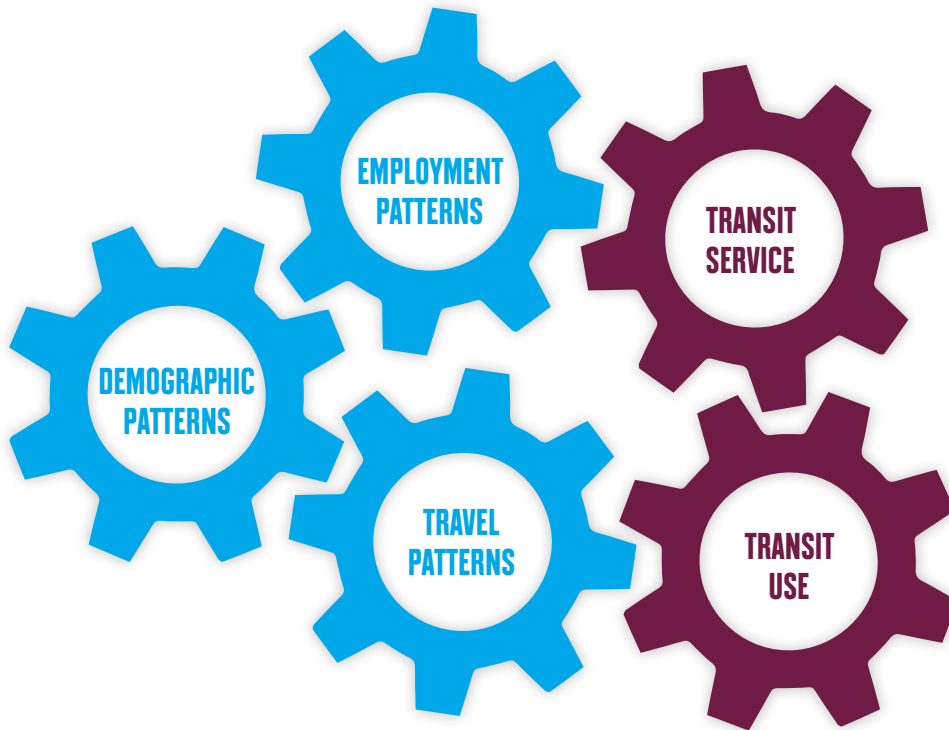
In this study, we examine how transit agencies responded to the pandemic. We show how they adjusted their services to safely meet the needs of those who continued to step on to trains and buses while doing their best to keep their employees healthy. We also investigate how transit agencies plan to adjust their services given changes in travel that may signal permanent shifts in the lifestyles, living locations, and working environments of many people. We then provide a framework that can help public transit agencies and other stakeholders respond in a way that ensures social and racial equity by improving access for everyone and that builds ridership as much as possible.

Our study examines changes in demographic patterns, employment patterns, and travel patterns. By “demographic patterns,” we mean where different types of people live—for example, younger people who choose to live in city centers to take advantage of vibrant activities and settings and families who are experiencing poverty and move to suburban neighborhoods. By “employment patterns,” we mean where different types of jobs are located. This could mean in a central business district versus a suburb or growth in the types of jobs that allow people to work from home. By “travel patterns,” we mean the trips people take between work and home, as well as for school, shopping, and recreation.

These three types of patterns are the framework for our study because they influence one another and are key to planning for effective, equitable transit service. The movement of people to suburban areas has historically encouraged the displacement of jobs to outlying places, as retail locations spring up near new homes and people with high incomes encourage their employers to shift offices and manufacturing locations out of urban areas (Squires 2002). Travel patterns then adjust accordingly. Meanwhile, all three types of patterns influence the public transportation system. Transit use is heavily affected by the location of jobs and housing, as well as, of course, the types of trips people want or need to take. It also reflects the amount of transit service available: people who do not have access to transit cannot take advantage of it. The interconnections between these patterns are illustrated in figure 1.

FIGURE 1

A Framework for Linking Demographics, Employment, and Travel, and Their Influence on Transit Use



Source: Authors' analysis.

We acknowledge that demographic, employment, and travel patterns are constantly shifting and that, unfortunately, the pandemic remains a major feature of life throughout the world. Moreover, these patterns vary tremendously by place; communities may experience the same changes in different ways. We rely on a limited sample of data that is, in some cases, lagged compared with what people are experiencing today. Even so, the framework we develop in this report—particularly its focus on linking demographics, employment, and travel—helps clarify our understanding that public transportation cannot be isolated into a world of its own: it reflects, and helps influence, the regions where it operates.

Even though some general patterns are outside transit agencies' control, we contend that their ultimate success or failure depends on their actions, as well as those of their political and civil servant leaders. Agencies have the opportunity to learn from communities that have responded successfully to challenging times and to alter their service accordingly, not only to preserve ridership where possible but also to build equitable access for all. We emphasize that the world might change in many ways and encourage agencies to think creatively about how to respond to those potential shifts.

Transit can and must play an essential role in the lives of people in communities throughout North America. Bus and rail services are more affordable and more accessible to a broader range of people—by age, income, and body type—than automobile commuting and are key to achieving the goal of building an equitable, sustainable society. We hope agencies and the public will learn from the experience we present here to make good choices about operating and planning for the future.

This Study

In June 2021, the American Public Transportation Association (APTA) commissioned our team—composed of researchers from the Urban Institute and the Center for Neighborhood Technology—to analyze the impact of the COVID-19 pandemic on public transportation agencies across North America and examine potential future trends that may affect them. APTA’s goal is to ensure that agencies can continue contributing to ensuring mobility for all—for example, by increasing ridership in the coming decades. We conceptualized this project as useful for understanding the challenges brought on by the pandemic and for learning best practices from several key agencies.

Our study uses a mix of empirical methods. We began by conducting a literature review that investigated both pre-pandemic trends and expectations for the future in demographics, employment, and travel. To understand views from across North America, we fielded a web survey to all APTA members that are transit agencies and ultimately collected responses from 74 agencies in 29 US states and one Canadian province (Alberta). The jurisdictions served by the surveyed agencies ranged from large regions (e.g., Houston, Seattle, and Southern California) to medium-sized areas (e.g., Buffalo, New York; Honolulu, Hawaii; and Knoxville, Tennessee) and small communities (e.g., Little Rock, Arkansas; South Bend, Indiana; and State College, Pennsylvania). (The list of questions posed in the survey is in appendix A.) We then worked with APTA to select five transit systems to use as case studies for identifying best practices for the future. Finally, we collectively developed detailed projections of changes that are likely to occur in the coming years, and we used those to develop recommendations for agencies about how to maintain service and plan for a post-pandemic environment.

For each of the case-study agencies, we collected data from officials. The data include routes and service levels before and throughout the pandemic period (from spring 2020 to summer 2021). We compared these data with information from the US Census Bureau’s American Community Survey and the Center for Neighborhood Technology’s AllTransit tool to analyze how service patterns and ridership levels compared with key demographic and employment variables.² Note that we used the most recent demographic and employment data available, but they were from a pre-pandemic period; moreover, the pandemic continues to evolve. Nonetheless, we believe the data still relatively accurately represent conditions. Finally, we conducted semi-structured interviews with 26 people, including people working for each of the case-study agencies. Specifically, we interviewed 4 CEOs, 17 staff members, and 4 board members from the following transit agencies:

- Regional Transportation District in the Denver metropolitan area (RTD)
- Los Angeles County Metropolitan Transportation Authority (Metro)
- Port Authority of Allegheny County in the Pittsburgh metropolitan area (Port Authority)
- GRTC Transit System in the Richmond, Virginia metropolitan area (GRTC)
- Spokane Transit Authority in the Spokane, Washington metropolitan area (STA)

We interviewed at least three and up to eight representatives of each agency and interviewed one community organizer. We intended these interviews to elucidate the key concerns of transit agency officials and their plans for the future. The interview protocol we used is in appendix B.

Our approach was approved by the Urban Institute’s institutional review board. All interviewees provided consent, and data were stored securely to ensure the confidentiality of respondents. Finally, our work was peer-reviewed by other researchers at Urban to ensure its quality.

Case-Study Transit Agencies

To select case-study transit agencies, we conducted a nationwide scan of agency responses to the pandemic by reviewing hundreds of news articles and press releases. This scan revealed a range of approaches, including changes to service patterns, fare policies, and operator requirements. We worked with APTA staff to identify five agencies that were APTA members, important because APTA staff helped connect us with interviewees and collect data. We chose agencies that represented a variety of geographies, operating conditions, and service levels. The case-study agencies were not selected to be statistically representative of transit systems nationwide. Rather, they allow us to provide detailed insight into how agencies in various circumstances responded to challenges created by the pandemic. Table 1 summarizes key operational characteristics of the agencies selected for analysis in 2019, before the pandemic.

TABLE 1
Case-Study Transit Agency Characteristics, 2019

Operated in Maximum Service				
Transit agency	Buses	Train cars	Vehicle revenue miles (millions)	Unlinked passenger trips (millions)
Regional Transportation District (Denver)	838	204	67.0	105.2
Metro (Los Angeles)	1,944	266	126.3	379.7
Port Authority (Pittsburgh)	603	58	32.0	64.0
GRTC (Richmond)	111	0	11.9	9.3
Spokane Transit Authority	124	0	9.4	10.6

Source: National Transit Database, Federal Transit Administration, accessed July 15, 2021, <https://www.transit.dot.gov/ntd/ntd-data>.

Notes: Buses operated in maximum service do not include vanpool or paratransit services. Vehicle revenue miles (the number of miles operated by buses and trains that are accessible to passenger) and unlinked passenger trips (the number of riders boarding, without counting transfers) are for all modes operated by the agency. The Regional Transportation District provides light and commuter rail services, Metro provides light and heavy rail services, and the Port Authority provides light rail services. Note that agencies have altered their service since 2019; Metro, for example, has moved some peak services to off-peak times.

The case-study agencies and their coverage areas vary in size, scope, and location. Spokane STA operates in the smallest urban area, with fewer than 400,000 residents, while the Los Angeles urban area has more than 12 million. In terms of fixed-route service, STA and Richmond GRTC operate bus services, and in the pre-pandemic period, they had about 10 million annual riders each. Meanwhile, Denver RTD, Los Angeles Metro, and Pittsburgh Port Authority operate significant rail systems, in addition to bus service, and had many more riders. The agencies are also located in different geographic areas, with one on the East Coast, one in the Midwest, one in the Rocky Mountains, and two on the West Coast.

Table 2 presents major characteristics of the areas in which the case-study agencies operate (we list data for cities, counties, and metropolitan areas, depending on the data; note that transit agencies operate over different sets of geographies, and riders may live in neighborhoods outside of the service area). Here, again,

differences stand out. The Denver region and core city, for example, are wealthier and have a lower share of residents who are living in poverty compared with the other four communities. For both the core city and the metropolitan area, Los Angeles and Richmond have the lowest shares of white non-Hispanic residents.¹ These differences may have affected transit agencies during the pandemic because who chose, or was required, to continue riding buses and trains varied based on the demographic makeup of a service area.

TABLE 2
Select Demographics of the Areas in Which the Five Case-Study Transit Agencies Operate

	Denver	Los Angeles	Pittsburgh	Richmond	Spokane
Share of the population that is white (2019)					
Core city	54.8%	28.7%	63.7%	41.9%	81%
Metro area	63.5%	29.2%	84.9%	57%	84.1%
Median household income (2019)					
Core city	\$75,646	\$67,418	\$53,799	\$51,285	\$52,447
Metro area	\$85,641	\$77,774	\$62,638	\$68,324	\$59,646
Share living below federal poverty level (2019)					
Core city	11.7%	16.7%	19.1%	18.9%	16.1%
Metro area	7.9%	12.4%	10.9%	10%	13.2%
Share working in professional jobs					
Core city	21.9%	18.6%	29%	20.1%	15.9%
Metro area	21.1%	18.3%	18%	18.7%	12.6%
Share of residents who are fully vaccinated for COVID-19 (September 2021)					
Core county	64%	58%	57%	n/a	52%

Sources: 2019 American Community Survey one-year estimates; “OnTheMap,” US Census Bureau, accessed September 10, 2021, <https://onthemap.ces.census.gov/>; Danielle Ivory, Mitch Smith, Jasmine C. Lee, Amy Schoenfeld Walker, Lazaro Gamio, Josh Holder, Denise Lu, et al., “See How Vaccinations Are Going in Your County and State,” *New York Times*, accessed September 9, 2021, <https://www.nytimes.com/interactive/2020/us/covid-19-vaccine-doses.html>.

Notes: Professional jobs are those in information, finance, insurance, professional, scientific, and technical services and management of companies or enterprises.

Table 3 shows how the five transit systems that we studied covered the people living and working in their metro areas before the pandemic. Across all five metro areas, public transit was far more accessible to households and jobs within the core city (not shown in table 3) than in metropolitan areas overall. For example, in the core cities of all five regions, transit service is available within a half-mile of more than 90 percent of households whose annual incomes are less than \$25,000, households without access to a vehicle, and professional jobs. Coverage across each metro area is dependent on the level of transit-supportive density of housing and jobs, the size of each metro area, as well as the level of transit service provided. For example, Spokane Transit Authority is authorized to operate in one of three counties in its metro area.

¹ Our team has decided to use the terms *Hispanic*, *Black*, and *white* when referring to Hispanic and Latina/o/x people; non-Hispanic African-American and Black people; and non-Hispanic white people, respectively. This choice differs from source material terms in some cases.

For each agency, we include the share of households in the metro area that resides within a half-mile of a bus or rail transit stop. The Denver and Los Angeles regions had the highest rates (76.1 and 88.9 percent of households, respectively), followed by the Spokane, Pittsburgh, and Richmond regions (58.3, 53.7, and 31.9 percent of households). In all regions, a minority of households had access to high-frequency transit service (every 15 minutes or less) at peak hours. This means that most people did not have easy access to show-up-and-go service. Access was even lower when considering high-frequency transit service at nonpeak hours. For example, in the Pittsburgh metro area, only 6.3 percent of households lived within a half-mile of all-day frequent transit service (not shown in the table).

Transit agencies in the Pittsburgh, Richmond, and Spokane areas reached between 52 and 69 percent of households that earned less than \$25,000. But those in the Denver and Los Angeles metro areas both reached more than 85 percent of these households.

Table 3 also includes the share of jobs in each metro area accessible to transit stops. The Denver, Los Angeles, and Spokane regions had the highest levels of accessibility, overall, for professional jobs, and for jobs in education and health. The Richmond region had the lowest. Agencies have room to expand their services, particularly to reach more households with frequent service, or outside core cities. In all regions, less than 40 percent of households live within a half-mile of frequent transit service at peak hours.

TABLE 3
The Reach of Transit Service before the COVID-19 Pandemic, by Metropolitan Area

	Denver	Los Angeles	Pittsburgh	Richmond	Spokane
Average number of jobs within a 30-minute commute	141,232	286,297	114,613	40,874	50,475
Within a half-mile of transit service					
All households	76.1%	88.9%	53.7%	31.9%	58.3%
Households with annual incomes of less than \$25,000	87.2%	92.7%	64.8%	52.5%	69.2%
Households near peak high-frequency transit	12.7%	39.4%	14.7%	5.8%	20.2%
All jobs	80.7%	93.3%	62.3%	46.2%	76.1%
Professional jobs	82.5%	94.4%	69.9%	42.3%	84.2%
Education and health jobs	83.9%	93.3%	70.4%	59.1%	82.9%

Source: Center for Neighborhood Technology’s AllTransit tool, using the 2013-17 American Community Survey five-year estimates, the 2015 Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics, and 2018 transit data.

Notes: Living within a half-mile of transit service means living within a half-mile of a bus or rail station. Service is provided in part by agencies other than the five case-study systems, although the majority of service in each metropolitan area is provided by the case-study agencies. High frequency service at peak times means a bus or train comes at least every 15 minutes between 7 and 9 a.m. and 4 and 6 p.m. on weekdays. Professional jobs are those in financial, insurance, real estate, rental, leasing, information, professional, scientific, and technical services. Education and health jobs are those in health care, social assistance, and educational services.

We draw upon information collected about each of these agencies throughout this report. By sharing agencies’ experiences that were more or less successful in meeting the challenges presented by the pandemic, we illuminate approaches that transit systems across North America can use to solidify their roles in the post-pandemic world. We highlight efforts by transit agencies to promote social equity and increase ridership.

Pre-Pandemic Trends

We can only understand the impacts of the COVID-19 pandemic on demographics, employment, and travel by comparing them with the trends under way in the years leading up to the health emergency. In this section, we review long-term trends in those three areas leading up to 2020 and discuss how they might inform our views of changes in the years to come. We find the following:

- Slowly but steadily, Americans, on average, have been moving away from city centers. This trend slowed in the 2010s, however, when the downtowns of many major metropolitan areas grew. Generally, college-educated and higher-income people moved closer to the center of cities, and families with lower incomes and people of color moved farther away.
- As with housing, jobs, on average, have continued to move away from city centers. This has occurred alongside growth in the health, education, hospitality, and service sectors and declines in the number of people with manufacturing jobs.
- Before the pandemic, transit riders in the US were disproportionately people of color and people with lower incomes. But communities' transit use differed dramatically—some areas of dense population and employment had many riders, while other communities had few.
- Although transit ridership grew more quickly than driving between 2002 and 2015, the trends reversed in the years leading into the pandemic: driving increased overall as transit ridership declined. These shifts took place as the share of Americans working from home (rather than driving or taking transit to work) grew and the use of ride-hailing services increased.

Demographic and Employment Trends Pre-Pandemic

The decentralization of US metropolitan regions is a long-term trend. In the post-war period, encouraged by cheap suburban and exurban housing, easy-to-access highways, and the degradation of urban public services, generations of Americans with the ability to leave urban environments have done so. And as people moved, employment went with them.

These trends have had wide-ranging effects. First, the movement out of older urban environments, itself the product of a growing dependence on automobiles, has reinforced automobile dependence because many suburban environments are designed to be accessed only by car and are inhospitable to people traveling by foot or bike. This has made increasing transit ridership difficult. Second, the growth of homes and jobs in the suburbs has largely reinforced or even worsened inequalities, because those who can least afford to move (and to drive) cannot benefit from new jobs, services, and other opportunities on the suburban edge.

The location of homes and jobs is an essential issue for transportation providers. Public transportation is typically most cost-effective when serving neighborhoods with relatively high job and population density, because it can attract more ridership per route mile (Cervero and Guerra 2011). US transit systems have been particularly reliant on downtown commuters because of the concentration of employment in those areas. Ridership is also likely to be higher when transit service is in communities with higher numbers of families with

low incomes, because they are less able to afford the cost of driving (Wang and Woo 2017). This does not mean that transit serving other types of neighborhoods is unimportant, but it does mean that employment and population trends affect who uses buses and trains.

Fewer and fewer Americans live in rural areas (Parker et al. 2018). Since 2000, the populations of large metropolitan areas have grown more quickly than those of nonmetropolitan or small metropolitan areas (Cohn 2019). But within those metropolitan areas, suburbs—including those at the far edge of urban regions—have grown far more quickly than urban cores in a typical year.³ In some cases, urban regions that lost population actually expanded in developed land area because of the sprawling locations of jobs and homes (Pendall 2003).

One consequence of this general spreading out was that between 2000 and 2012, the average person's access to employment dropped—meaning they had fewer jobs within a commutable distance. This trend occurred for people in more than two-thirds of metropolitan areas. This was particularly troubling for people with low incomes and people of color; both of these groups experienced larger declines in job access than both white people and people with higher incomes. Declines in access occurred in two ways. First, as both downtowns and surrounding neighborhoods emptied out, people who remained in disinvested urban cores found fewer jobs available (Wacquant and Wilson 1989). Second, suburban jobs were distributed unevenly, with priority going to wealthy, white communities, and as a result, residents of suburban communities with high shares of people living in poverty and people of color experienced a decline in job access that was twice as high as that of suburban residents overall (Kneebone and Holmes 2015).

The demographic composition of US metropolitan areas has also changed dramatically in the past few decades. Both urban and suburban counties have more residents of color and immigrants. And in all types of counties, the population is aging quickly and becoming poorer. Between 2000 and 2016, suburban counties experienced this trend more dramatically than either urban or rural counties (Parker et al. 2018).

Recent Growth of Central-City Cores and Suburbanization of Poverty

Although decentralization has been a broader trend in US metropolitan life for decades, recent years have seen a “back to the city” movement. Between 2004 and 2015, jobs concentrated geographically at a faster pace than job growth overall in the largest metropolitan areas in the United States. This meant that employment density increased in just a few neighborhoods, creating or reinforcing major employment nodes, rather than spreading jobs further apart. This increase was largely driven by four metropolitan areas: New York, Chicago, San Francisco, and Seattle, which also have some of the nation's densest transit networks (Shearer, Vey, and Kim 2019).

In recent years, the populations of the densest areas of many metropolitan areas have grown, too. Although suburban counties experienced the fastest population growth between 2010 and 2020, the number of households in neighborhoods with relatively high densities (those with more than 5,000 households per square mile) rose more than 8.5 percent, a larger increase than in the nation overall. As a result, the density of the typical American's neighborhood is higher than at any time since before 1990. And a higher share of the US population lives in high-density neighborhoods (those with at least 10,000 households per square mile) than at any time in at least three decades.⁴

The people who have been moving to central cities are different in some ways from the people who lived there years ago. In 1980, the residents of US downtowns had the lowest incomes and the least education, compared with neighborhoods throughout metropolitan areas, and downtowns had relatively few white inhabitants. Since 2000, however, these trends have reversed: people with high incomes and many years of education (especially those who are white) have migrated to urban cores in droves (Baum-Snow and Hartley 2019).

Meanwhile, the people leaving urban cores are significantly less affluent and have fewer years of education than the people moving in (Baum-Snow and Hartley 2019). Since 1990, the share of people living in poverty has grown dramatically in suburban areas. Most of those who have suburbanized are of white or Hispanic backgrounds, although Black families have also left cities. Majorities of all ethnic groups in the US now live in the suburbs, as does a majority of people living below the federal poverty level (Raphael and Stoll 2010). Despite these changes, people of color have not necessarily benefited from increased access to employment—the previously mentioned uneven distribution of jobs means that people who have low incomes and live in the suburbs are less likely than their wealthier counterparts to have short commutes. This is particularly true for Black and Hispanic families.

The trends described here suggest that some aspects of where people live and work within metropolitan areas has changed considerably. Yet more dominant than rise of central-city gentrified neighborhoods or the suburbanization of poverty is that communities of people with low incomes—typically people of color—continue to have the fewest resources and the fewest opportunities. These disinvested communities are located both in urban centers and suburban locales.⁵ Decades of fragmented governance and exclusion have kept the full population from accessing opportunity (Freemark and Steil 2021).

Mismatched Location of Homes and Employment in Urban Regions

The growing interest among some groups in living at the core of metropolitan regions could be seen as an opportunity for transit agencies to increase their ridership. But the 2000s and 2010s were marked by another trend that made serving areas with high-quality transit more difficult: inadequate housing construction in the most sought-after urban areas. Between 2010 and 2020, the populations of metropolitan areas that experienced large increases in wages and productivity did not expand as quickly as those in less economically successful regions (Kober 2021). One explanation is that restrictive zoning has kept housing growth in those communities from being as strong as it could be. For example, in the Boston, New York, and San Francisco regions, where pay and productivity is high, the number of jobs increased much more than the number of housing units. The San Francisco area—the worst-case example—gained more than 400,000 jobs between 2008 and 2019, while over a similar period, only 120,000 housing units were built. By comparison, the Atlanta region added a similar number of jobs but built 260,000 housing units.

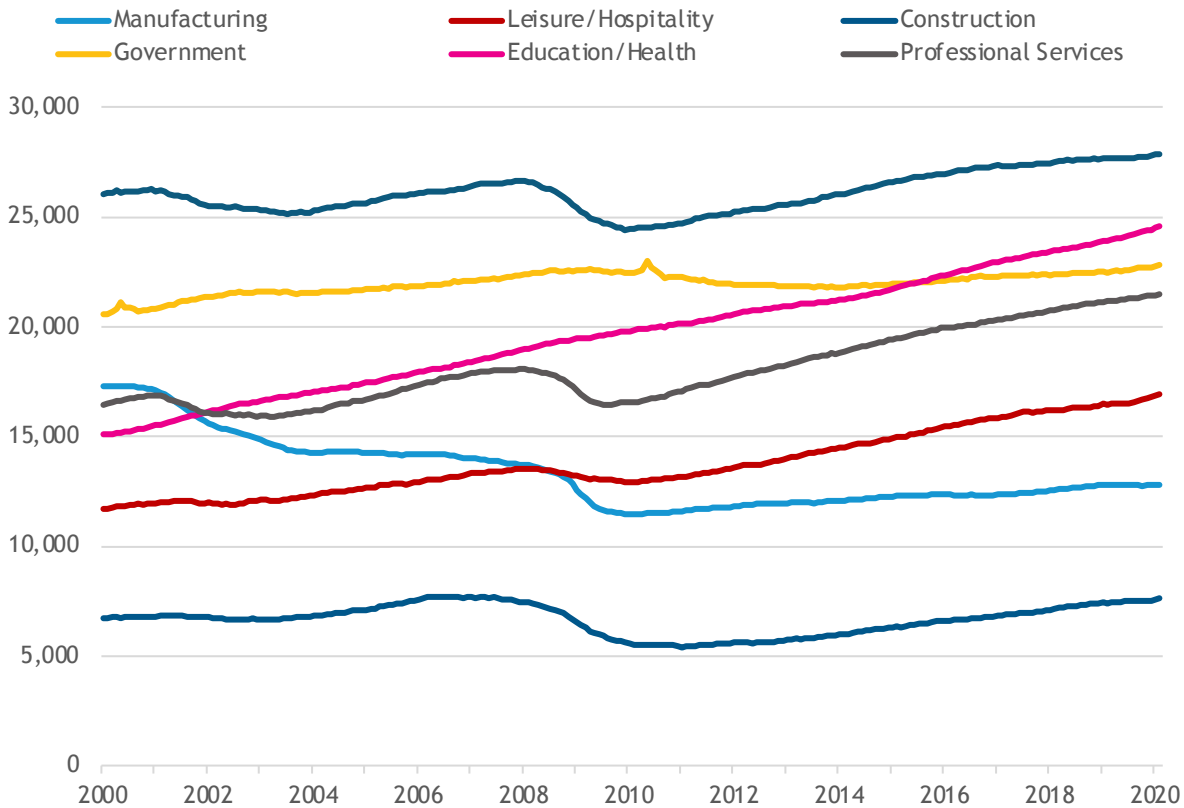
The regions with insufficient housing construction often also have the highest housing costs and the largest increases in rent, conditions that make finding housing difficult for families with lower incomes. Thus, the families that are most likely to rely on transit have been discouraged from living in many dense, downtown-adjacent neighborhoods with effective transit options.

Changes in Employment Sectors

Changes in the types of jobs that residents hold have ramifications for people's commuting behavior: some jobs require people to work from specific locations, and others do not. Some employment locations are in dense neighborhoods where transit is more effective, others are not. Figure 2 shows how employment in several major economic sectors changed between 2000 and early 2020, right before the COVID-19 pandemic began. The trends that stand out are that employment in the education and health sector increased steadily over those two decades, and that leisure, hospitality, and service employment was higher in early 2020 than in 2000. At the same time, US manufacturing employment declined substantially.

FIGURE 2
Before the Pandemic, Employment Was Growing in the Education, Health, Hospitality, and Service Sectors and Had Declined in Manufacturing

Number of monthly employees by sector, January 2000 through February 2020



Source: Federal Reserve Bank of St. Louis and US Bureau of Labor Statistics. 2021. <https://fred.stlouisfed.org/categories/11>

Notes: Military personnel are excluded from government employment data.

Changes to employment patterns reflect variations in the patterns of investment demand in location. Even though jobs focused on digital production theoretically allow people to work from anywhere, businesses that provide such employment are particularly focused on creating jobs in large global centers like New York and San Francisco. Indeed, the physical density of information and professional services jobs in individual neighborhoods of the most attractive metropolitan areas increased far faster than generalized job growth would predict. Now, information, finance, professional services, and headquarters jobs are often located in the densest parts of metropolitan areas. At the same time, logistics, manufacturing, construction, and retail jobs are in the least-dense areas. This has benefited denser communities in global cities economically, but it has done little for other areas of globally attractive major regions, or for many small and midsize cities and those with an industrial heritage (Shearer, Vey, and Kim 2019).

Travel Trends before the COVID-19 Pandemic

Before the COVID-19 pandemic, North American travel was experiencing both relative stasis and rapid change. On the one hand, US commuters were commuting by car and public transportation in roughly the same numbers as they had for the previous three decades. On the other hand, a relatively small number of people were shifting toward other options, including using bike share systems and ride-hailing services, or choosing not to commute at all and working from home. These changes suggest that Americans were preparing themselves to try new options to get around and that US transit agencies could be effective in attracting new users to their services if they are appropriately positioned.

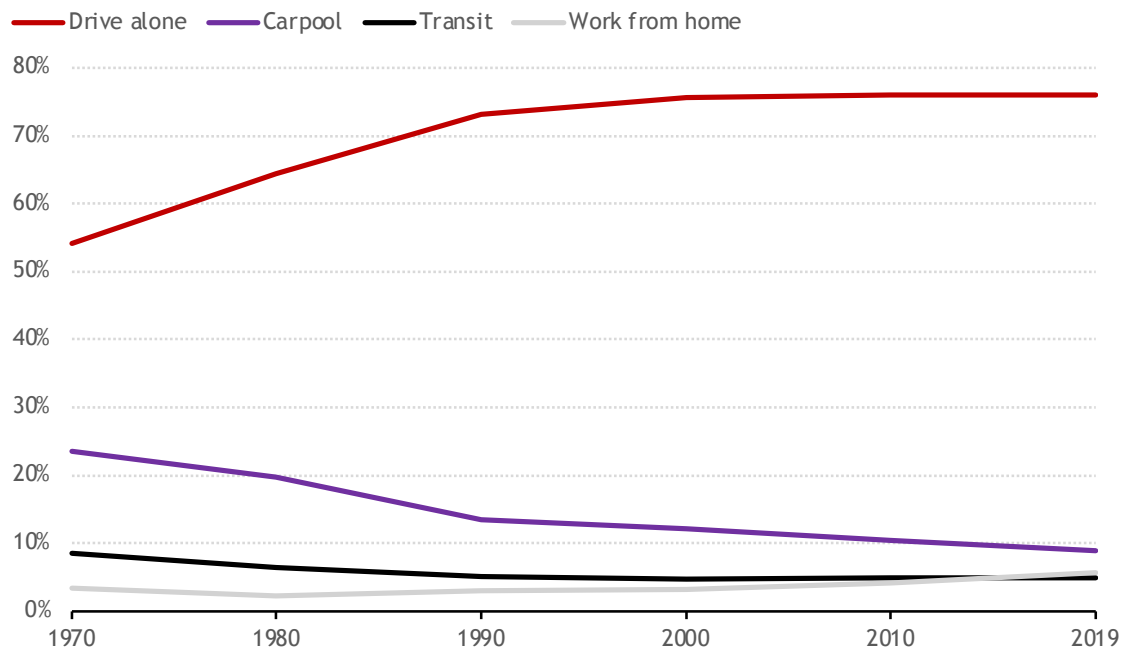
The pandemic increased telecommuting, or working from home. But telecommuting had become increasingly common even before the pandemic. Between 1990 and 2019, working from home was the only mode of commuting that had significantly increased (figure 3). This trend has been particularly relevant to dense, urban counties, where the share of telecommuters more than doubled in a half-century. Counties with higher levels of professionals and people with more years of education also have a higher share of people who telecommute. Meanwhile, working from home declined by half in the most rural states (largely because fewer people are farming).⁶

Nevertheless, through 2019, working from home remained a largely marginal proposition for the vast majority of American workers. In the decades leading up to the pandemic, more than 70 percent of commuters drove alone to work, and only about 5 percent took transit or worked from home.

FIGURE 3

Before the Pandemic, More People Were Working from Home, but It Was Still Far Less Common Than Commuting to Work by Car

Share of working-age commuters who drive alone to work, carpool, take transit, or work from home



Source: US Census decennial data for 1970, 1980, 1990, 2000, 2010; 2019 American Community Survey one-year estimates.
Notes: Other modes, including walking and biking, are not included.

One reason that the share of people using transit to commute has been limited—and not growing—is that jobs have been developed far from housing, often on the edge of metropolitan areas. Nationwide, most jobs are more accessible by car than by transit, and relying on transit can mean a trip takes twice as long as it would using a personal automobile (if bus or train options are even available).⁷

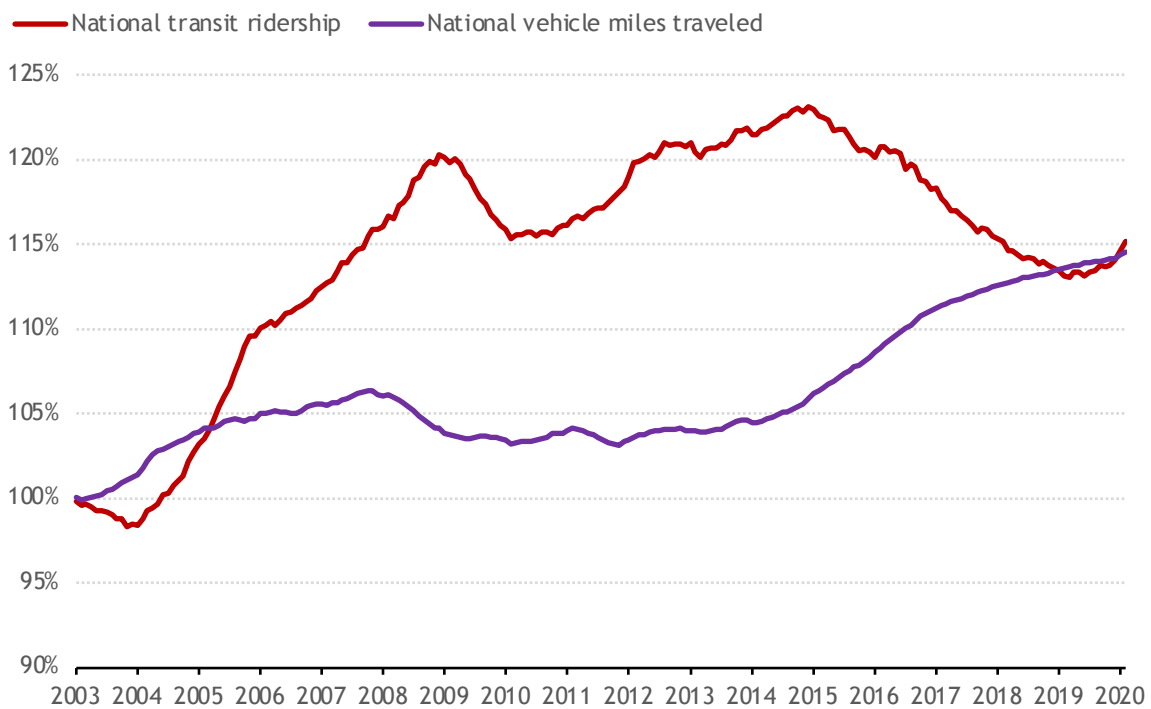
These broad commuting trends indicate that transit has not been able to keep up with driving as a way for people to get to work. But they do not tell the whole story, because they do not account for other types of trips or differences among communities within the US. Indeed, before the pandemic, only about half of transit trips were for commuting (Salon et al. 2021). Some cities had high transit use (in New York, most commuters took transit), while others had low rates (in Orlando, Florida, fewer than 1 percent of commuters took transit).

Nor do these trends tell us about how different groups of people travel. People of color are the most prevalent users of transit in urban areas. Among regular transit riders in urban areas, 43 percent are either Black or Hispanic, and 40 percent are white (Clark 2017). This is despite the fact that white people overall represent the majority of US residents. Moreover, immigrants are much more likely to use transit than US-born residents, perhaps because they are more likely to live in communities where transit is a reasonable travel option.⁸ Travel patterns also differ by age; the millennial generation, for example, drives and takes transit less than other groups. Before the pandemic, millennials were early adopters of virtual meetings and used other travel alternatives (Shaheen and Cohen 2018).

In figure 4, we compare trends in national transit ridership (incorporating all trips) with those for vehicle miles traveled (VMT) on the nation’s roads (meaning the amount of motorized travel undertaken on roads). Between 2002 and 2015, national transit use increased almost 25 percent—far more than the roughly 6 percent increase in VMT in the same period. But starting in 2015, the trends reversed; transit ridership declined considerably, and VMT increased dramatically. Even so, just before the pandemic, transit ridership nationwide was beginning to make something of a comeback, propelled in part by increasing use of the heavy rail systems in New York City and Washington, DC.

FIGURE 4
Transit Ridership Rose More Quickly than Driving between 2002 and 2015 but Then Declined

Rolling 12-month ridership and vehicle miles traveled as a share of 2002 levels



Sources: “Monthly Module Adjusted Data Release,” National Transit Database, Federal Transit Administration, July 2021, <https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release>; “Travel Monitoring,” Federal Highway Administration, June 2021, https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm.

Notes: National vehicle miles traveled are seasonally adjusted.

One reason for the recent increases in vehicle miles traveled and the decreases in transit ridership is likely the rise of “new mobility” options such as ride-hailing services. Before the pandemic, ride hailing had become popular; by 2016, 21 percent of adults in major cities were using the services. People sometimes replaced occasional taxi trips with ride hailing, but a significant share of people used ride hailing for regular travel instead of transit (Clewlow and Mishra 2017). These substituted transit trips would have typically been taken

by bus.⁹ Moreover, even though ride-hailing services were often initially marketed as “filling the gap”—that is, better serving communities of color and areas without adequate transit service—ride-hailing mostly serves neighborhoods where households have higher levels of income and where transit is already available (Barajas and Brown 2021).

The net effect of ride-hailing trips is likely a large increase in VMT. One reason may be that drivers “dead-head,” meaning they drive around without a rider to find a new customer (Henao and Marshall 2019). Though ride-hailing services now offer “pooled” rides (in which drivers pick up multiple customers on the same trip), these efforts have been uneven and may not reduce overall VMT. In the next section, we show that ride-hailing declined substantially during the pandemic, so its long-term impact is unclear.

Bike sharing is another “new mobility” option that may have contributed to declines in transit ridership. Although it has supported transit trips in small and medium-sized regions, it has substituted for bus or rail journeys in denser, larger places (Shaheen and Cohen 2018).

Changes in Demographics, Employment, and Travel during the COVID-19 Pandemic

Across North America, the COVID-19 pandemic caused the living, working, and traveling patterns of people to shift. Especially in the initial months of the crisis, millions of Americans stayed home, either because their employers switched to remote work or to follow public health guidelines, and many people lost their jobs. At the same time, millions more people continued to go to work (often to avoid losing their incomes)—these workers provided essential services in places such as hospitals, schools, grocery stores, and food-processing facilities; made deliveries; and were responsible for other priorities we rely on to live. In this section, we show the following:

- Early claims were made that the pandemic had encouraged a mass movement of Americans away from urban areas. However, even though rents in dense areas that likely have better access to transit declined during the pandemic, real-estate investment demand has increased above pre-pandemic norms in those communities, too. This suggests a long-term continuation of pre-pandemic trends in urban development.
- Employers adapted quickly to the shift to working from home. But many people, particularly essential workers, have continued to go to work during the pandemic. And despite a decline in office occupancy, employers, including in the tech sector, appear to be planning a return to in-person work. Many, but not all, of their jobs are in transit-accessible places
- The immediate response to the pandemic was a major decline in both road and transit use, although bus trips and driving did not fall as much as rail ridership. For a period of 2020, rush hour disappeared on both roads and transit. In recent months, however, car use has returned to pre-pandemic levels. Transit ridership is increasing overall, although at a modest pace.

Changes in Demographic Patterns

During the pandemic, hundreds of thousands of Americans have died. These deaths have undoubtedly changed the composition of some communities. Many people in North America have also moved. Some wanted more space for working from home, others wanted private lawns for spending time outside, others moved in with family or friends to save money on rent, and still others took advantage of rent declines to move into urban centers. Between 2019 and 2020, regions hit hard by the pandemic, like New York and San Francisco, saw many people move from city centers to suburban or exurban areas. Overall, though, moving trends were largely consistent with what had been occurring in the years before the pandemic.¹⁰

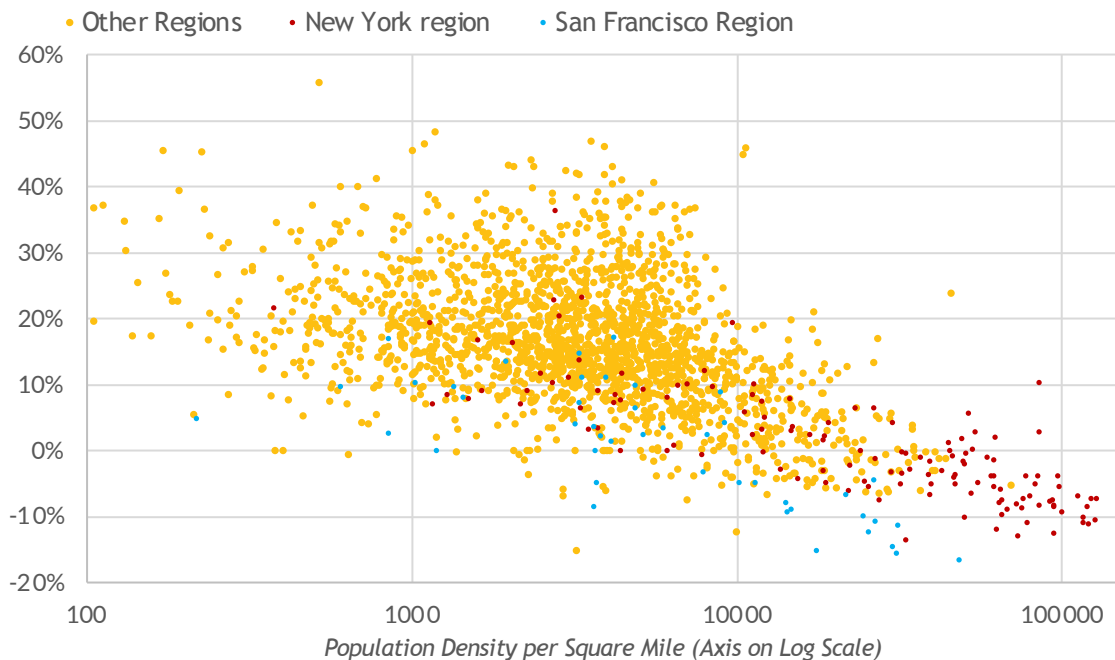
These moves away from the city center in places like New York and San Francisco that are dense and transit-friendly are reflected in trends in rents, which generally reflect the demand to live in a particular community. In figure 5, we explore changes in the average rent of several thousand largely urban zip codes (roughly 2,000, representing about 5 percent of the nation). Between January 2019 and mid-2021, rent increased in most communities for which we have data, growing an average of 15 percent.

Yet these trends were uneven across the country. Figure 5 shows that the correlation between population density and rent increases is somewhat negative, meaning that communities with lower population densities had larger rent increases than communities with higher densities. On average, the rent in zip codes with population densities of less than 2,500 people per square mile increased 19.9 percent over the study period, compared with an increase of 17.5 percent for zip codes with 2,500 to 5,000 people per square mile, 13.8 percent for those with 5,000 to 10,000 people per square mile, and 1.4 percent for those with more than 10,000 people per square mile. In other words, rents rose the least—and, in many cases, declined—in the areas where transit is likely the most cost-effective and the most used, likely reflecting a drop in short-term demand and potentially population.

Figure 5 highlights the New York and San Francisco regions, which have some of the densest zip codes in the country. During the study period, rents declined in many of these areas. Indeed, rents fell in the Boston, Chicago, New York, San Francisco, and Washington, DC, regions. Before the pandemic, these metropolitan areas had the highest shares of commuters who use transit; more than 12 percent of workers in each region took train or buses. At the same time, during the pandemic rents increased rather dramatically in several Sun Belt regions—including Los Angeles, Miami, Atlanta, and Dallas—each of which has relatively low transit use.¹¹

FIGURE 5
Rent Increased More in Zip Codes with Moderate Population Densities and Fell in Those with the Highest Densities

Change in the Zillow Observed Rent Index between January 2019 and August 2021 for 2,170 zip codes



Sources: Zillow Observed Rent Index for zip codes, September 2021, <https://www.zillow.com/research/data/>; 2015–19 American Community Survey five-year estimates.

Notes: Only about 5 percent of all zip codes nationwide are included. The Zillow rent index represents the market-rate rent in the area represented. More information is available at <https://www.zillow.com/research/data/>.

The causes of the rent declines in certain areas may reflect changes in employment and financial conditions. According to a recent survey, about 5 percent of American adults moved because of the pandemic, and a plurality of them said they had done so for financial reasons (sometimes because of the loss of a job). As of November 2020, about half of such movers had gone to the home of a family or friend. Young adults and Black and Hispanic renters were more likely to have moved than the population as a whole.¹² Faced with limited incomes and sometimes falling behind on rent, many found themselves doubling up in housing, crowding living spaces.¹³ Others who could chose to leave the most expensive urban centers to save money.

Changes in rents can help us understand people's level of interest in living in certain communities, but they do not necessarily speak to long-term trends, because rents change relatively rapidly in response to demand. Changes in home values, on the other hand, reflect interest in investing in a community. Higher prices in a place indicate a durable desire to live there. From this perspective, trends differ somewhat from those already presented.

Figure 6 compares the changes in home values from before the pandemic started to summer 2021 in the 30 largest metropolitan areas and their respective central cities with the share of workers who commute by transit in each of these locations. Overall, home values increased in each studied metropolitan area and central city, indicating long-term interest among people to live in even the most populous, densest communities. For example, home values increased 20 percent in the car-dominated Miami region, but they rose even more in the transit friendly Washington and Boston areas (21 and 22 percent, respectively).

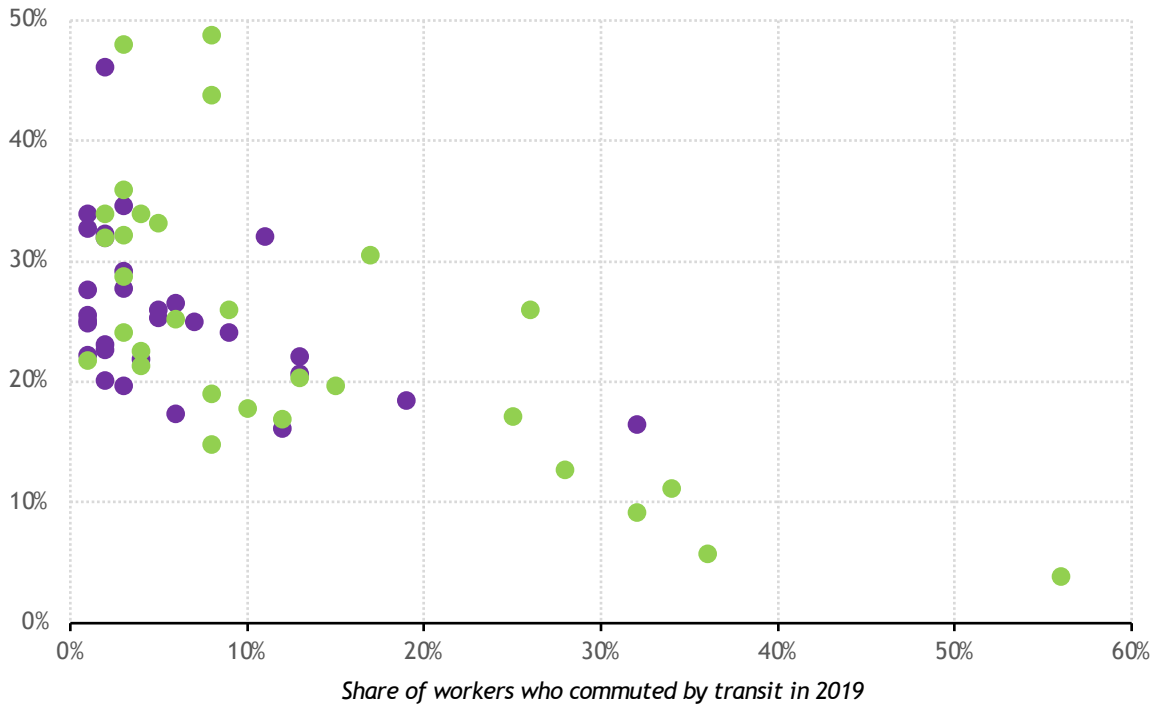
Even so, these trends are mixed. Home values grew less in communities that had higher levels of bus and train ridership before the pandemic than they did in communities with more car use. Among the 30 largest US central cities, home values increased the least in New York, San Francisco, Boston, Washington, DC, and Chicago—all heavily transit-dependent. On the other hand, home values increased the most in Austin, Texas; Phoenix; Detroit; Tucson, Arizona; and Memphis, where transit use is limited.¹⁴ This indicates that the pandemic may have dampened people's interest in living places with higher population densities and where public transportation is more useful.

FIGURE 6

Home Values Increased in All of the Nation's Largest Metropolitan Areas and Central Cities, but They Increased Less in Areas with More Transit Use

● 30 largest metropolitan statistical areas ● Central cities of largest metro areas

Change in Zillow Home Value Index between January 2019 and July 2021



Sources: Zillow Home Value Index, September 2021, <https://www.zillow.com/research/data/>; 2019 American Community Survey one-year estimates. Notes: The Zillow home value index represents the typical home value in the area represented. More information is available at <https://www.zillow.com/research/data/>.

Changes in Employment Patterns

The economic impact of the COVID-19 pandemic dramatically changed the employment environment. Millions of Americans lost their jobs, particularly those held by low-wage workers (Bateman and Ross 2021). Many of the jobs that were lost were in sectors whose workers were likely to commute by transit. Many people who lost their jobs also lost benefits such as health insurance, putting them into difficult financial positions (Karpman, Zuckerman, and Peterson 2020). As of August 2021, the US still had 5.3 million fewer people employed than it did in February 2020.¹⁵

The pandemic affected workers in other ways as well. The share of employees working from home increased dramatically. Millions of Americans were opening their laptops at home and communicating via online meetings, rather than in-person conversations. These changes may have a long-term effect on how and where people work—and those changes may, in turn, affect long-term travel patterns.

As an immediate response to the pandemic, employers altered their work-from-home policies (Bick, Blandin, and Mertens 2020). By the middle of 2020, 44 percent of interviewed employers in the US had put in place flexible working policies, an increase from 24 percent before the pandemic (Yildirmaz and Klein 2020). In the early months of the pandemic, almost half of employees were telecommuting.¹⁶ People who worked from home were more likely to be younger, to live in regions with higher levels of COVID-19 infection, and to work in management and professional occupations such as information services jobs (Brynjolfsson et al. 2020).

The rise in working from home led to inequitable access to safe employment. Those who could not work from home—people with jobs in hospitals, grocery stores, and the like—became “essential workers” praised by the public. But they also sometimes worked in unsafe environments, and many people in low-wage jobs did not have adequate personal protective equipment. Compared to those who could work from home, these essential workers were more likely to be women, be Black or Hispanic, have lower levels of education, and work part time (Salon et al. 2021). These same workers were also more likely to be fired from their jobs even though they were providing important services for society (Angelucci et al. 2020).¹⁷ Additionally, continuing to work outside the home increased these workers’ risk of infection because they were less able to social distance (Jay et al. 2020). Some people ultimately gave up their jobs because of the health risks or to help care for children in remote schooling and lost their income. The net result was that the pandemic reinforced inequities that already persisted in American society.

Even so, the rise in telecommuting influenced the nature of employment during the pandemic. One question that deserves further research is the degree to which working from home becomes a full-time or part-time phenomenon—in other words, whether some workers will never go into the office or will have a hybrid arrangement, in which they telecommute for some of the workweek. These trends in working from home may be dependent on other factors, such as whether school is in session.

The commercial real-estate sector was also affected by the COVID-19 crisis. A year into the pandemic, many companies had reduced the amount of office space they occupied. As a result, vacancy rates increased nationwide and in major markets, threatening the health of downtowns, which are reliant on offices for most of their employment. In New York, for example, Manhattan had 22 million square feet of available office space and the highest vacancy rate on record, in early 2021. That said, asking rents for office space have barely budged during the pandemic, a situation that indicates demand for these spaces could be long term. Office space leasing picked up in 2021, with tech companies leading the way. Even so, the delta variant of the coronavirus may have at least temporarily paused this renewed activity.¹⁸

The degree to which these changes in employment patterns will be made permanent is unclear. Economists have demonstrated the importance of what is referred to as agglomeration in building economic productivity. Agglomeration theory contends that people who live and work near one another produce more jobs, expand the economy more quickly, and offer greater innovations than people living and working in more dispersed living environments (Fang and Yu 2017; Fujita and Thisse 1996). Evidence suggests that these agglomeration effects have held and perhaps even intensified despite the growth of the information economy. The pandemic, however, may have changed the situation as it made working virtually normal for information and professional workers.

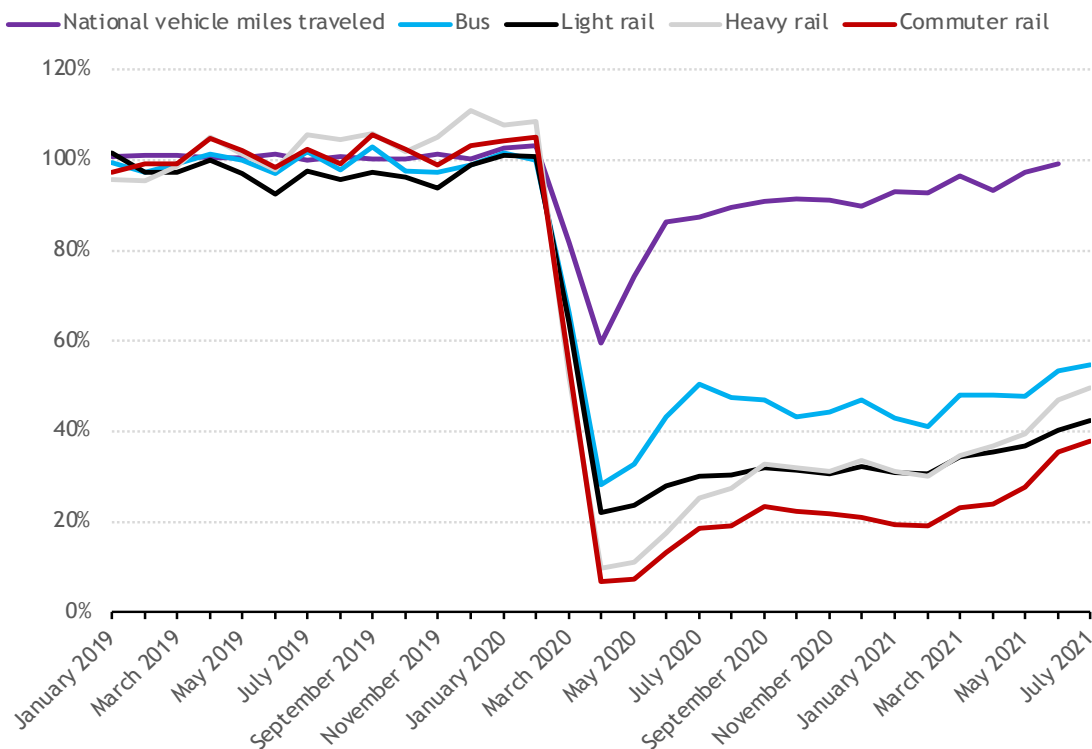
Changes in Travel Patterns

When the pandemic hit, Americans dramatically altered their travel habits. People who moved out of cities no longer used bus and rail services. People who telecommuted no longer drove to and from their offices. People with children no longer dropped them off at school—and children themselves stayed home. As the coronavirus spread, Americans saw realities change: The smog above Los Angeles seemed to lift. Highways and subways—once packed to the gills—were suddenly empty. And some residential streets became multimodal—people walked and biked where once only cars roamed. In this section, we show that some of these changes may have been ephemeral. Evidence suggests that many Americans may be returning to their 2019 travel practices despite the persistence of the pandemic. On the other hand, the pandemic may have altered our understanding of who uses and who is reliant on public transportation. Time will tell how much of these changes will persist.

What is clear is that people in the US hugely reduced their travel in March and April 2020. Figure 7 documents changes in national driving (vehicle miles traveled/VMT) and transit use across various modes. In spring 2020, VMT levels fell 40 percent, bus ridership dropped 70 percent, and rail ridership declined 80 to 90 percent. These monthly declines in driving and transit use were the largest in US recorded history.

FIGURE 7
Travel in the US Cratered in 2020; Only Driving Is Back to Normal

Monthly use of various modes of transportation as a share of 2018 levels



Sources: “Monthly Module Adjusted Data Release,” National Transit Database, Federal Transit Administration, July 2021, <https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release>; “Travel Monitoring,” Federal Highway Administration, June 2021, https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm.

Notes: Data are ridership or vehicle miles per month divided by equivalent data in the same month in 2018. Bus includes services that the Federal Transit Administration classifies as MB (motor bus), RB (rapid bus), TB (trolley bus), and CB (commuter bus); light rail includes LR (light rail), SR (streetcar), and YR (mixed-light/commuter rail); and heavy rail includes AG (automated guideway) and HR (heavy rail). Vehicle miles traveled are seasonally adjusted.

Several trends in the pandemic period stand out. First, by June 2021, driving had returned to 2018 levels. Second, a large share of riders has returned to using transit. Nationwide, as of July 2021, buses were carrying about 55 percent of the passengers they did in 2018, and use of heavy and light rail was at about 50 and 40 percent of 2018 levels, respectively. Commuter rail, heavily dependent on offices downtown, has been the slowest service to recover. Behavior in cities overseas, such as London, suggests that transit ridership will come back more fully in fall 2021.¹⁹

Of particular interest to this study is *who* has continued to ride transit during the pandemic. While white men gave up transit use in large numbers, the people who kept riding included people of color, people who speak Spanish, women, and people with relatively low incomes—all people more likely than white men to still be working in-person jobs. Unsurprisingly, given the makeup of essential workers, people working in food service, health care, building maintenance, and sales also kept riding.²⁰ Looking at ridership by age, transit use dropped a lot among users younger than 18 (which is likely related to school closures) and among those 25 to 44 years old (which might be the result of the shifts to working from home) (Liu, Miller, and Scheff 2020).

Changes to travel patterns during the pandemic also varied by neighborhood type and demographic makeup. While travel to downtown business districts declined on all modes, there was increased activity at other town centers, such as neighborhood shopping. As such, cross-town trips remained relatively popular (Tsay, Giaramidaro, and Tierney 2021). Transit routes that served neighborhoods in which people of color and families with lower incomes primarily reside held on to their ridership more effectively, on average, than those in neighborhoods with greater shares of white and wealthier residents (Fried 2020). These trends may partly explain why bus service did not lose as much of its ridership as rail options during the pandemic, since whiter and wealthier people—particularly those in professional occupations—are more likely to ride train services than buses.²¹

Moreover, when people used the transportation system changed. Before the pandemic, US cities had high levels of congestion on all modes of transportation at specific times of the day. Peak travel was often, but not always, on inbound routes to downtown in the morning and on outbound trips in the evening. During the pandemic, cities worldwide experienced large drops in traffic congestion at all times of day, but particularly at the peak.²² Rush hour flattened out, and demand became relatively even throughout the day; these trends were particularly striking for transit systems so used to peak-level use.²³ This flattening might have occurred for several reasons, including that fewer people were traveling for work and a higher share of commuters was working jobs with nontraditional hours.

The pandemic also had a major effect on ride-hailing services. Companies such as Uber and Lyft lost a majority of their riders, and even though some have come back, the companies have a long way to go before use returns to 2019 levels. One problem they face is that rising wages economy-wide have made attracting drivers more difficult, which reduces the level of service the companies can provide. Because of falling ridership and concerns about ensuring adequate social distancing, ride-hailing companies canceled their pooled ride services. These types of offerings may return in an altered form in the coming years, but ride hailing is no longer the formidable growth industry it seemed to be before the pandemic.²⁴

Other “new mobility” options had better outcomes during the pandemic. After a decline in spring 2020, bike-sharing schemes have attracted new customers. In some places, such as New York City, use of bike-sharing systems reached record levels in 2021. Use of e-bikes in particular, which was marginal in cities nationwide before the pandemic, increased, both as part of bike-share systems and by individual riders.²⁵

These trends indicate that the pandemic caused people to change the way they moved around their communities. Yet evidence suggests a return to pre-pandemic norms is happening. By mid-2021, traffic congestion in US cities was nearly as prevalent as it was two years earlier. And not only had midday traffic worsened—which was expected given the flattening of the demand curve at the pandemic’s start—so had the evening rush hour.²⁶ Meanwhile, rush-hour commuting by transit has been slowly increasing across the US, and in some cities abroad, like Paris, ridership in September 2021 is close to pre-pandemic levels.²⁷

Public Transportation Agencies' COVID-19 Responses

During the COVID-19 pandemic, public transportation agencies across North America have been on the front line. Drivers, mechanics, cleaners, ticket agents, and others played an important role in keeping the economy rolling by helping essential workers get to work. Even in the darkest days of the crisis, hundreds of thousands of Americans stepped through the doors of buses and trains. Transit agencies, however, faced a challenging environment. Drawing on a national survey of transit system staff and a detailed investigation of five case-study agencies, we find the following:

- Nationally, almost all transit agencies cut service during the pandemic in response to reduced ridership, employee absences due to illness and contact tracing, and difficult economic circumstances that were only partly resolved by federal funding. Many transit agencies chose to eliminate fares, and others chose to eliminate routes. Some agencies' services have now returned to pre-pandemic levels.
- The case-study agencies developed varying approaches to service changes. For example, neither Richmond GRTC nor Spokane STA significantly reduced service levels on mainline bus operations, while the others did. On the other hand, all agencies experienced major reductions in vanpool and paratransit service demand, resulting in a reduction in service provision. Pittsburgh Port Authority focused service on neighborhoods whose residents are more likely to be people of color and have low incomes.
- Unlike the other agencies, GRTC retained ridership levels that were close to those from before the pandemic. This likely resulted from several factors, including limited changes to service on local bus routes, the elimination of fares, excellent communication with the public, and a service area concentrated on the core city.
- The five case-study agencies responded quickly and decisively to the pandemic. Interviewees noted the major interventions that systems made to secure the safety of employees and riders; address difficulties they were having recruiting workers and assembling adequate materials; and improve communications.
- Transit agencies have to some degree altered their priorities in service planning and are increasingly focused on achieving equity, in part by collaborating with other agencies nationwide to identify best practices.

The findings we present in this section show that riders in all case-study systems were affected by agency decisions, some more equitably than others. The ridership analysis suggests that riders with lower incomes remained the most consistent transit customers and continued to use bus and rail services for their daily needs. And interviews with agency staff showed how they adjusted their services creatively to reflect that fact.

Nationwide Responses

To understand the approaches that transit agencies took in response to the pandemic, we conducted a survey of APTA members in July and August 2021. (APTA members carry 90 percent of the riders using transit in the United States and Canada.²⁸) The poll expanded on a similar survey that APTA distributed to all members (not just transit agencies) in January 2021 (Dickens 2021). The survey helps provide insight into why transit agencies cut service dramatically in spring 2020, soon after the pandemic extended its reach throughout the country (Ahangari, Chavis, and Jaihani 2020).

The pandemic led almost 90 percent of surveyed agencies to reduce transit service levels at some point between the start of the pandemic and mid-2021. The most common reason given by survey respondents (78 percent) was diminished demand. Staff from 36 percent of agencies noted that service was reduced to avoid economic losses. Importantly, because most agencies did not cut staff and turned to overtime to make up for health-related staff vacancies and new cleaning protocols, operating costs remained constant even as agencies lost fare revenue from reduced ridership. A notable 34 percent of agencies reported having to cut service because staff members became sick with COVID-19.

According to the survey results, making rides free (at least for a time) was the second-most-common response to the pandemic (53 percent). Other agency responses to the pandemic included eliminating routes (38 percent) and canceling vehicle purchases or capital projects (33 percent), according to the survey.

Case Study Transit Agency Service Changes

The five case-study transit agencies responded in different ways to the changes in ridership during the pandemic. Some reduced service on commuter routes and added service on local routes, others decreased service system-wide, and still others maintained pre-pandemic levels of service. In this section, we describe how they altered bus and train operations in different parts of their service areas, and how ridership responded.

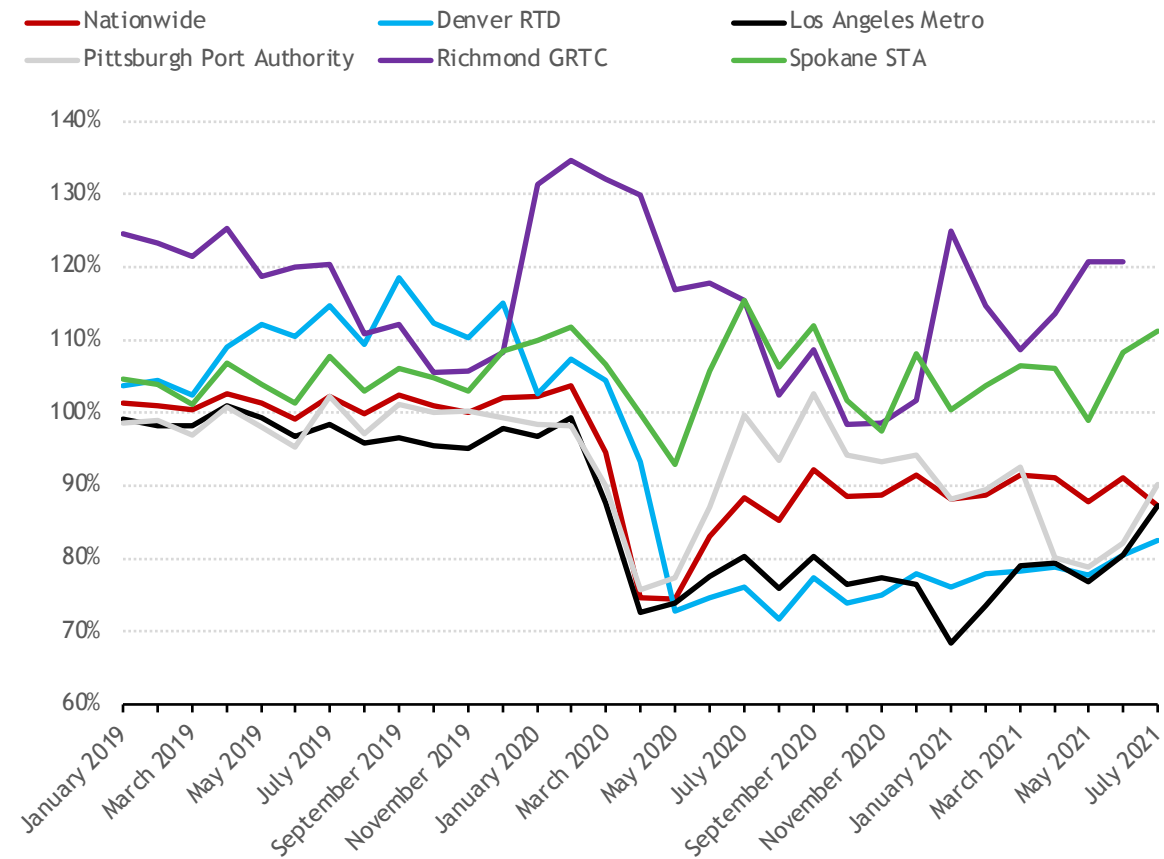
Adjustments in Mainline Bus and Rail Service Versus Paratransit Options

Service levels during the pandemic varied among the five case-study transit agencies. Figure 8 shows how transit agencies adjusted their mainline bus and rail routes in 2020 and 2021 relative to their 2018 service levels (adjusted by month). GRTC and STA largely held service constant—by summer 2021, both offered more miles of transit service than they had in 2018. The other transit agencies took different approaches. By May 2020, RTD, Metro, and the Port Authority had each cut service about 30 percent. And in July 2021, the service of all three agencies was still down at least 10 percent from pre-pandemic peaks, with RTD's service down almost 20 percent.

FIGURE 8

Several Case-Study Transit Agencies Cut Bus and Rail Service Considerably in Spring 2020

Vehicle revenue miles as a share of 2018 levels



Source: “Monthly Module Adjusted Data Release,” National Transit Database, Federal Transit Administration, July 2021 <https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release>.

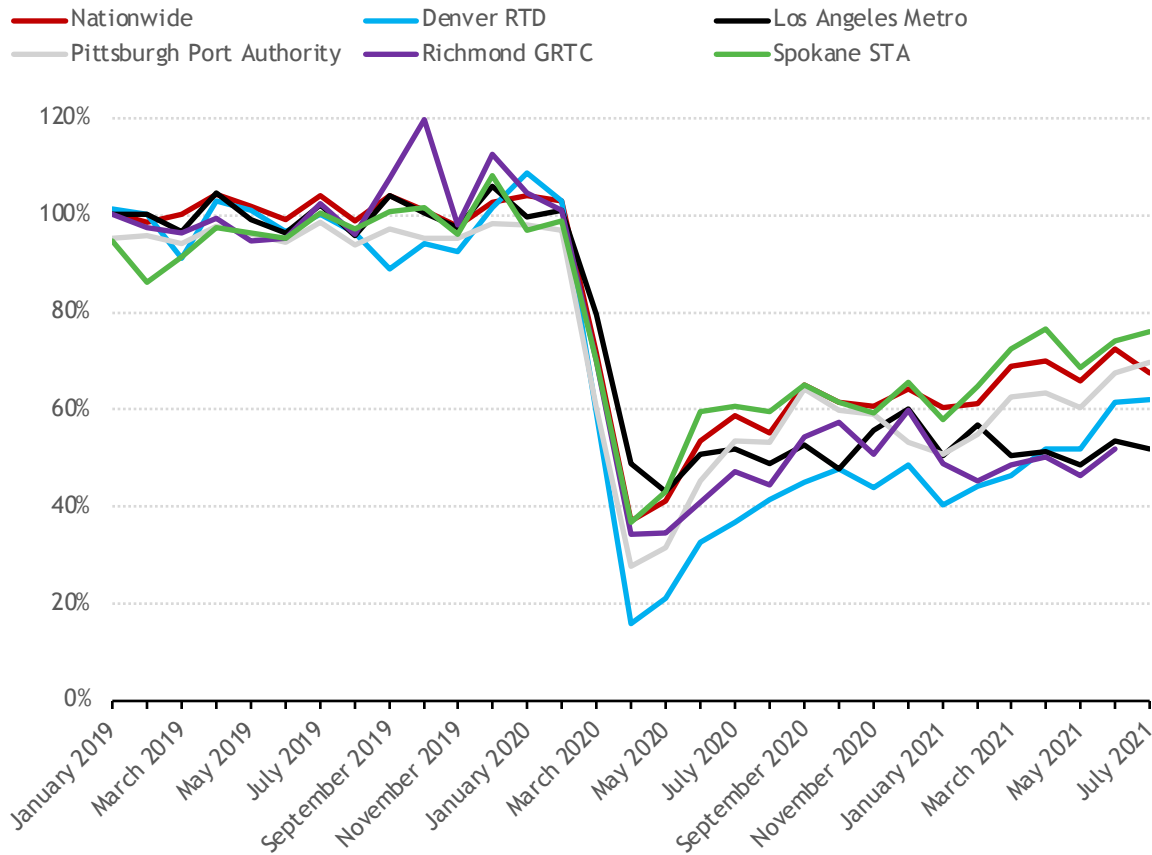
Notes: Data are vehicle revenue miles per month divided by the equivalent miles in the same month in 2018. Revenue miles include mainline bus and rail service (and funicular for Pittsburgh) but not vanpool or paratransit service.

Figure 9 shows the changes in the agencies’ levels of paratransit service, which operates largely on a request-for-service basis. All transit agencies provided at least 50 percent fewer paratransit miles in spring 2020, compared with the same period in 2018, due to decreased demand for trips. Paratransit service has increased, although more slowly than mainline bus and rail service; as of July 2021, all agencies were providing at least 20 percent less paratransit service than they had before the pandemic, due to suppressed demand.

FIGURE 9

Agencies Reduced Paratransit and Vanpool Services in Response to Lower Demand During the Pandemic

Paratransit revenue miles as a share of 2018 levels



Source: "Monthly Module Adjusted Data Release," National Transit Database, Federal Transit Administration, July 2021. <https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release>.

Notes: Data are vehicle revenue miles per month divided by the equivalent miles in the same month in 2018. Revenue miles include vanpool and paratransit service (and *publico* service in Puerto Rico) but not mainline bus and rail service.

Equity of Access in Service Changes

In an effort to investigate how the transit agencies altered their service at the neighborhood level and to evaluate the equity implications of these changes, we analyzed the service provided by four of the five transit agencies both before and during the pandemic using publicly available General Transit Feed Specification data.²⁹ The agencies shifted their service during this time; service increased in some areas and dropped in others.

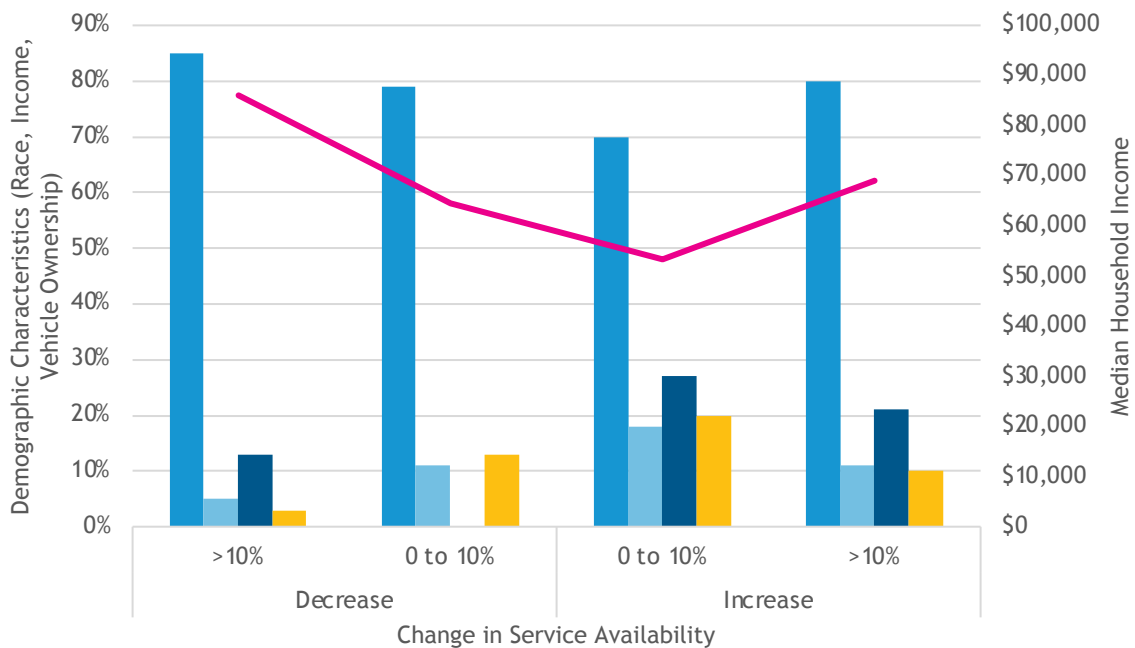
We considered how transit service changed in neighborhoods, defined as census block groups. We aggregated service availability, defined as transit trips per week, to all bus and rail stops in each neighborhood and then calculated the percentage change in service from before the pandemic to during the pandemic. We divided all neighborhoods served into four groups based on the size of the service changes, comparing those with the

largest decreases in transit service during the pandemic with those with the smallest decreases (or, in some cases, an increase).³⁰ We report the demographic characteristics across these different neighborhood groups.

The four agencies altered service in a variety of ways. RTD and Metro reduced service to more than 90 percent of neighborhoods in their respective service areas in the Denver and Los Angeles metropolitan areas. On the other hand, the Port Authority increased service to 37 percent of neighborhoods in the Pittsburgh area, and STA increased service to 46 percent of neighborhoods. All in all, the latter two agencies were better at maintaining service to their service areas at large.³¹

Figure 10 compares service changes by the demographic attributes of impacted neighborhoods served by the Port Authority. The service changes we examined show that in some cases, residents of color and households with low incomes made up a large share of the neighborhoods experiencing the smallest declines in service—and in some cases, those neighborhoods saw an increase in service. In Pittsburgh, the neighborhoods with increases in service overall (and especially those with a 0 to 10 percent increase in service) had larger shares of people of color, lower median household incomes, more individuals below the poverty line, and a higher share of households with no vehicles than those with decreases in service.

FIGURE 10
Characteristics of Transit Users in Neighborhoods with Larger and Smaller Changes in Transit Service during the Pandemic, Port Authority of Allegheny County



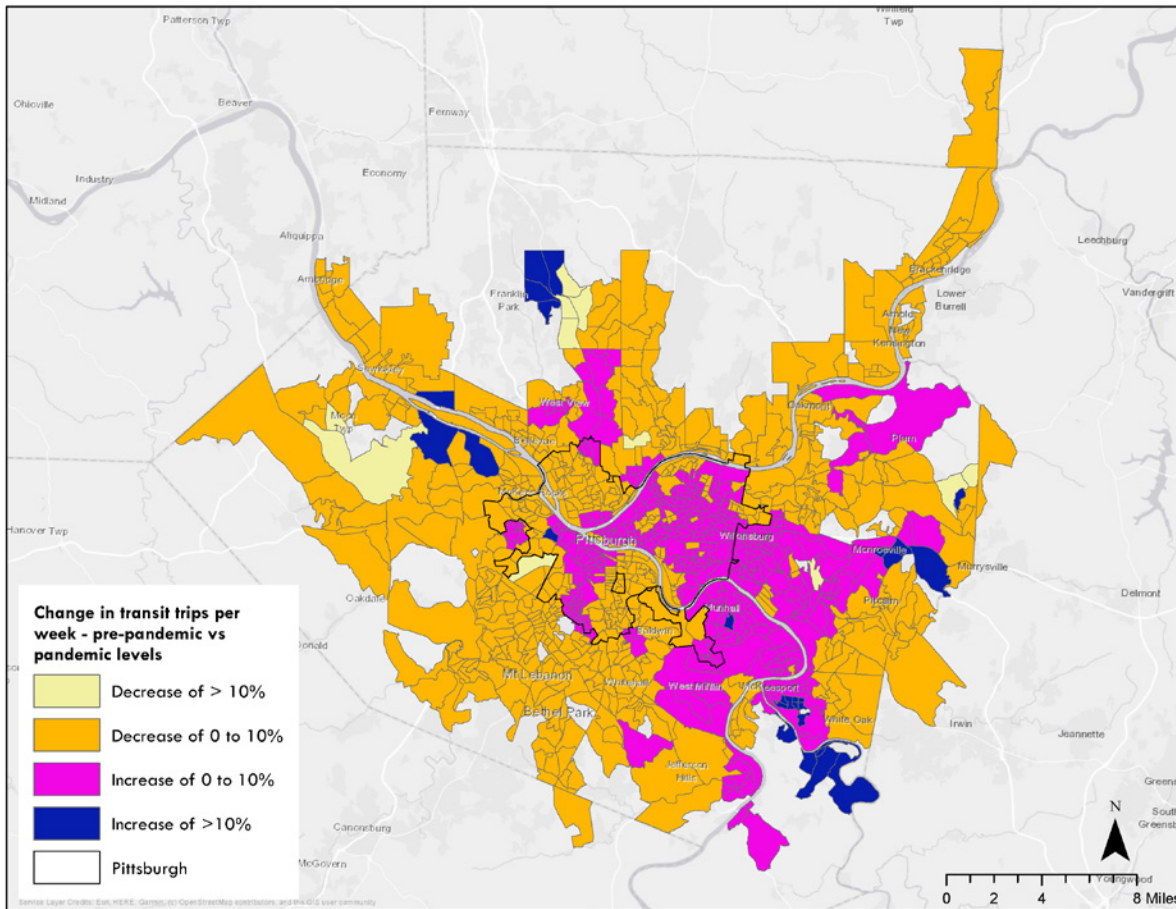
Sources: General Transit Feed Specification data from Transit-Feeds, accessed September 1, 2021, <https://transitfeeds.com/feeds>; 2015–19 American Community Survey five-year estimates.

■ Share non-Hispanic White
■ Share of households making less than \$25,000
— Median Household Income
■ Share of individuals below poverty line
■ Share of households with no vehicles

In figure 11, we compare changes in the transit service that the Port Authority provided in the Pittsburgh metropolitan area. The neighborhoods shown in pink and blue experienced service level increases, while the areas shown in orange and yellow experienced declines. Overall, much of the Port Authority service area saw declines, although most neighborhoods of the city of Pittsburgh and suburbs such as Monroeville, Munhall, and Wilkinsburg had increases in service levels. Neighborhoods of the central city north of downtown, and suburbs west of the city had declines in service. More investigation is needed to understand the land uses, distribution of jobs, and key destinations in these areas, but this sort of mapping analysis can help us understand the degree to which transit agencies responded equitably to changes during the pandemic.

FIGURE 11
Transit Options Declined in the Port Authority Service Area Overall, Although Some Core Neighborhoods Experienced Increases

Change in average number of weekly transit trips (by bus and train vehicles) in the Pittsburgh region from before the pandemic to during the pandemic, by census block group



Source: General Transit Feed Specification data from TransitFeeds, accessed September 1, 2021, <https://transitfeeds.com/feeds>.
Note: Service change is calculated as the percentage change in average weekly transit trips provided between the period from March 17, 2019, to June 27, 2019, and the period from March 15, 2020, to June 25, 2020.

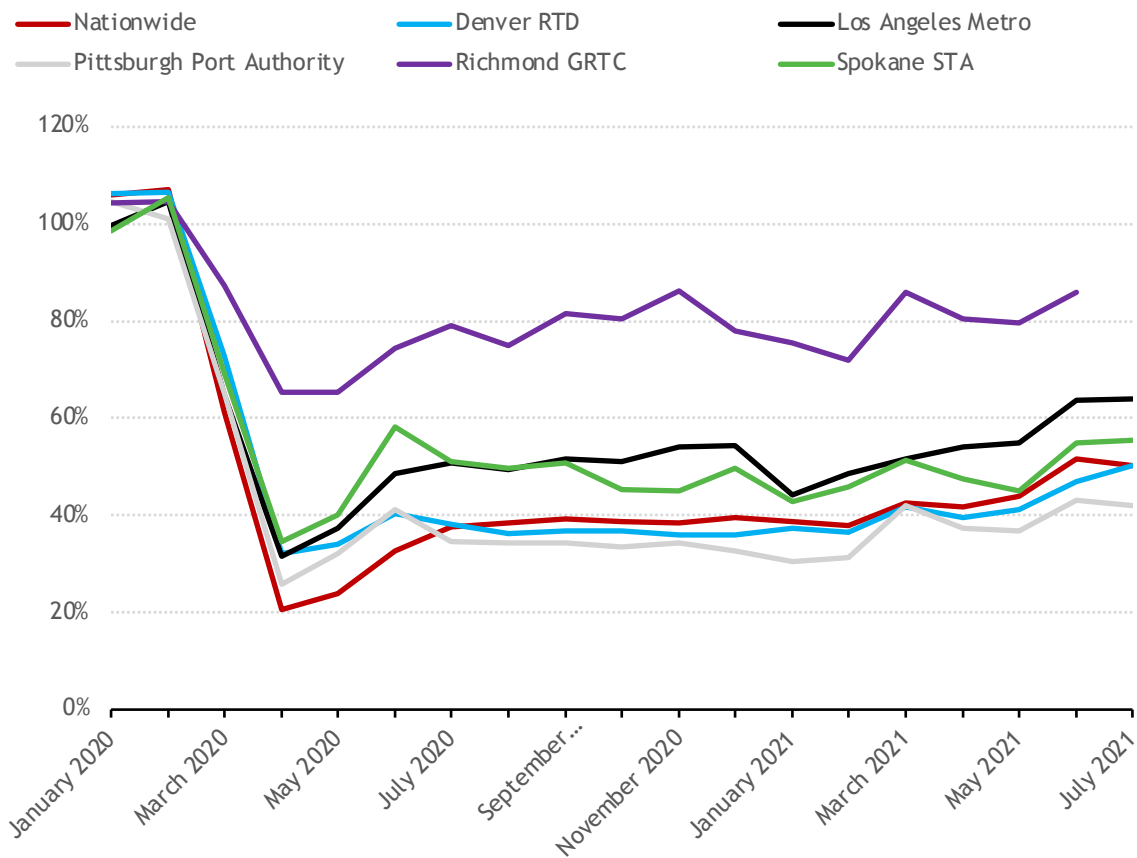
Ridership Outcomes

All five of the case-study transit agencies experienced large drops in ridership beginning in March and April 2020 (figure 12). Richmond GRTC had the smallest drop; its April 2020 ridership levels (the low point) were 65 percent of its ridership in 2019. Pittsburgh Port Authority experienced the greatest decline, to 26 percent of 2019 ridership, although that drop was not as large as the national average.

FIGURE 12

Transit Ridership Dropped Off Suddenly in March 2020

Monthly ridership as a share of 2019 levels



Source: “Monthly Module Adjusted Data Release,” National Transit Database, Federal Transit Administration, July 2021. <https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release>.

Note: Data are ridership per month divided by equivalent ridership in the same month in 2019.

One potential explanation for GRTC’s unique experience is the service planning done by the agency. In 2018, the agency conducted a systematic bus route redesign meant to improve services for the most vulnerable neighborhoods and prioritize the essential workforce. In addition, Richmond’s service area was already more limited than the other case-study agencies (table 3), so it may have been able to better focus its resources on neighborhoods with high ridership.

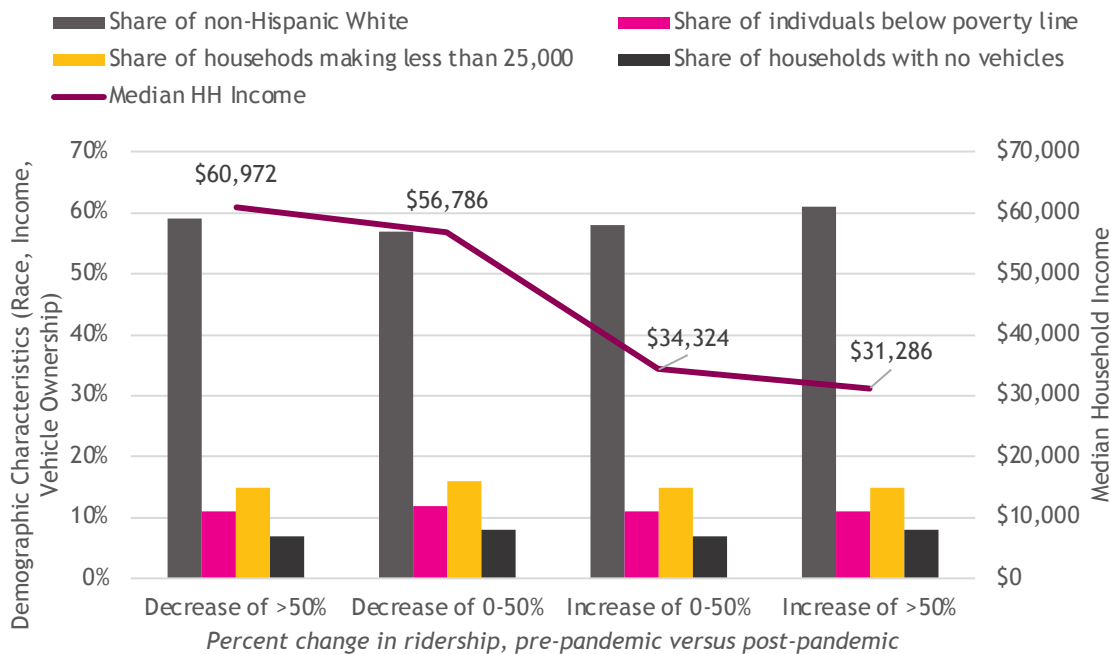
Another factor likely influencing GRTC’s ridership success is the demographics of the area it serves. Nationally, cities with a higher level of essential workers and more vulnerable populations had systematically higher transit use (Liu, Miller, and Scheff 2020). And of all of the core cities served by the case-study transit agencies, Richmond’s had the lowest median household income and the second-highest share of inhabitants living below the federal poverty level (table 2). It also had the second-lowest share of white residents.

To further understand ridership trends, we examined changes at the transit stop level for RTD services in Denver (figure 13). These data describe ridership trends, not service availability (as in figure 10). Stops were categorized into four groups based on the percentage change in ridership from a period before the pandemic (August 2019) to a period during the pandemic (September 2020): two groups experienced increases in ridership (one is of stops with increases of between 0 and 50 percent, the other is for stops with increases of more than 50 percent) and two groups experienced decreases in ridership (between 0 and 50 percent and more than 50 percent). Demographic data for people living within a half-mile of each stop within each group was aggregated. The transit stops with the highest increases in ridership during the pandemic were in neighborhoods with lower incomes; those with ridership increases had median household incomes of \$35,000 or below, on average, while those with ridership declines had median household incomes of \$56,000 or above. Other demographic measures, however, including the shares of white residents, households living below the federal poverty level, and households without vehicles, were similar across the groups of neighborhoods.

FIGURE 13

In Denver, Transit Ridership Increased in Neighborhoods with Lower Median Household Incomes

Characteristics of people living within a half-mile of transit stops grouped by stop ridership change during the pandemic



Sources: Regional Transportation District; 2015-19 American Community Survey five-year estimates.

Notes: The demographic data are averages based on the people who live within a half-mile of a transit stop. Data compare ridership in August 2019 versus September 2020.

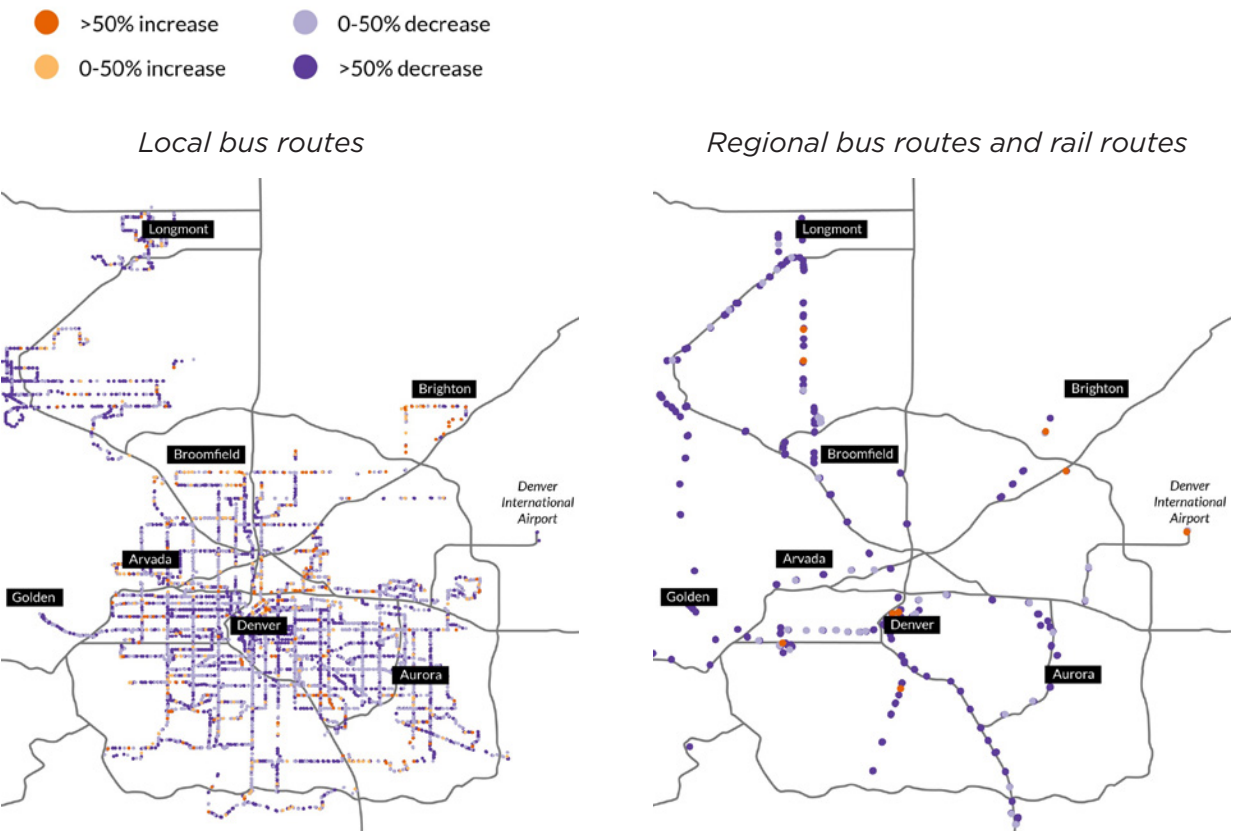
Some routes in the RTD system stood out for maintaining or increasing ridership at stops served (figure 14). Ridership increased on 7 percent of stops served by local bus routes, both in the central city and suburbs (shown on the left). In the suburbs of Broomfield and Brighton, both north of the city of Denver, stops along the 120th Avenue and Brighton routes had more riders during the pandemic compared with the same period before the pandemic. Compared with Denver, Brighton has a higher Hispanic population and lower per-capita incomes (\$31,578 in 2019, compared with \$47,802 in Denver).

At the same time, rail and express bus routes experienced significant declines in ridership virtually everywhere (shown on the right). Of all stops, 82 percent had a ridership drop of more than 50 percent in September 2020, compared with the pre-pandemic period. (Among local bus routes, only 58 percent experienced a similar magnitude of change.) The A Line commuter rail service that connects downtown to Denver International Airport, however, continued to maintain significant use. Interviewees suggested that because the airport never shut down and because the route is time competitive with automobile alternatives, it managed to continue pulling in riders.

FIGURE 14

In the Denver Metropolitan Area, Local Bus Routes Held on to Riders More Effectively

Percentage change in average daily boardings at transit stops between August 2019 and September 2020



Source: Denver RTD, stop-level average daily boardings.

Themes in Case Study Transit Agency Response

To better understand transit agency responses beyond their operational changes, we conducted detailed interviews with staff members representing the five case-study networks. These interviews helped us identify key approaches and experiences shared across the agencies. In this section, we highlight six themes that emerged. Agencies:

- quickly adapted to deal with new problems, including through collaboration;
- secured employee and rider safety;
- handled staffing and material shortages;
- improved communication with the public;
- built on essential federal support; and
- changed fare and service policies to prioritize core riders and essential workers.

Agencies' pandemic responses speak to the challenge of keeping up with rapidly changing conditions while developing new best practices that suggest a way forward in a post-pandemic world.

1. Quickly Adapting to Deal with New Problems, Including through Collaboration

At the onset of the pandemic, all agencies experienced a sudden drop in ridership alongside the need to keep their employees safe, particularly frontline operators. Interviewees largely emphasized that with limited information and frequently changing state and federal guidelines, agencies had to be nimble and adapt to changing situations while ensuring a response that was equitable for both riders and employees. Agencies also worked together to identify solutions.

AGENCIES CONVENED QUICKLY TO ADDRESS IMMEDIATE ISSUES

Pittsburgh Port Authority convened a COVID-19 response team as early as February 2020 to develop a pandemic plan that prioritized the health and safety of agency employees. Other transit agencies immediately worked to develop internal crisis teams to identify how to respond to major issues. This was important because unexpected challenges arose. Richmond GRTC, for example, had agreements with local businesses at the ends of routes that allowed bus operators to use restrooms when needed, but pandemic restrictions, including business closures, eliminated these options. GRTC acted rapidly, strategically placing six portable toilets throughout the service area.

Frequently changing guidance and policies from state and federal entities created difficulties for these sorts of rapid responses. Port Authority staff mentioned, for example, that governmental mandates came at inconvenient times at the end of the week. Its response was to develop a team of union and management staff to provide updates on new requirements to all staff. Denver RTD staff noted that changing safety guidance from the federal Centers for Disease Control and Prevention on the nature of the virus made adjusting its health protocols for ventilation and cleaning in buses a challenge.

Although some interviewees shared that the initial response could have been faster and more reflective of their respective communities' needs, many emphasized that they did the best they could with the information available. Interviewees mentioned the need to right-size service delivery based on changing demand and each organization's capacity. One interviewee said it was important not to "overpromise [only] to then underdeliver."

APTA CONNECTED TRANSIT AGENCIES

Interviewees shared that they took advantage of APTA-facilitated meetings, calls, and other resources to learn what other agencies were doing and share best practices. For example, RTD participated in weekly APTA calls and leveraged the meetings to learn where to look for equipment like disinfectants and personal protective equipment. Some agency officials reached out to staff members from other agencies they had met at previous APTA events.

NEW OPERATIONAL APPROACHES WERE NEEDED TO FILL GAPS

At times, transit agencies had to respond to unintended consequences of their policies. For example, GRTC tried to protect bus operators from the virus by asking passengers to board via the back doors and preventing riders from heading to the front, but this meant the back of the bus often became crowded. In response, on routes where buses sometimes ran out of space, GRTC ran paratransit vehicles behind mainline buses to add capacity.

Changes outside the agencies' control also required adjustments to day-to-day operations. For example, the sudden declines in automobile traffic and transit ridership caused stop-to-stop travel speeds to increase; as a result, transit operators slowed down so they could stick to the schedule. At RTD, operational staff realized that service scheduling systems that had been efficient during regular times did not function appropriately given pandemic-induced changes.

OVERTIME HELPED, AND EMPLOYEES WERE ASKED TO TAKE ON NEW JOBS

Reductions in the number of available personnel (because of illness among staff members or staff members' families) and hiring difficulties meant that many employees were asked to work overtime or to shift the kind of work they did to fulfill unmet needs. For example, in Pittsburgh, because of staffing limitations and the need to sanitize buses overnight, before transit operations resumed, the Port Authority asked mechanics to pitch in on sanitizing vehicles, sometimes during odd hours. In Denver, RTD had to reconsider how to prioritize work, and some maintenance tasks on buses not being used for service had to be delayed as a trade-off.

2. Securing Employee and Rider Safety

Transit agencies enacted quick and efficient changes to fleets to keep employees working and passengers riding safely. In some cases, agencies expanded transit service as they took on a new role, providing access to health services.

KEEPING OPERATORS AND MECHANICS HEALTHY BECAME A TOP PRIORITY

At the pandemic's outset, as the list of unknowns grew, transit employees experienced high levels of anxiety. These feelings were particularly acute for workers who continued providing direct service to riders and those coming into physical contact with shared surfaces. The transit agencies worked to address their employees' health concerns in several ways: the Port Authority allowed immunocompromised or older employees to take paid leave for up to three months (fitting in with union-negotiated paid leave programs), and Spokane STA gave operators two hours of paid time off for each dose of a COVID-19 vaccine they received. GRTC also gave employees paid leave after vaccine doses. The Port Authority, meanwhile, worked with its union to ensure that employees were financially covered for coronavirus testing and quarantining if needed, and employees who were uncomfortable with their pre-pandemic roles were allowed to move into other positions.

AGENCIES EXPANDED EFFORTS TO COMMUNICATE WITH STAFF

Many agencies bolstered internal communications, providing ongoing updates on various platforms, to better interact with and inform staff. GRTC communications staff became more focused on internal communications and expanded their use of newer tools, such as Facebook messaging and texting. Many operators and mechanics had not previously communicated with the organization through more traditional approaches like email, so this new outreach filled a gap. Meanwhile, agencies like STA created weekly videos featuring employees who were involved in providing essential public transportation service.

AN ALL-OUT EFFORT WAS MADE TO ENSURE THE SAFETY OF TRANSIT VEHICLES FOR RIDERS

Several efforts were undertaken to prevent the spread of COVID-19 and ensure transit vehicles were safe to ride. Most transit agencies implemented vehicle capacity limitations, a form of social distancing that capped ridership on individual vehicles and allowed for distanced seating. Alternatively, when capacity limits were not in effect, agencies ran more vehicles so riders could still be distanced from one another. While implementing capacity limits, the Port Authority created a mobile app to provide riders with data on crowding so they could choose to travel at their comfort level. RTD limited buses to 15 riders, a significant drop from the 45 or more who were allowed before the pandemic; this rule required the agency to run more buses on some routes. GRTC did not implement capacity limitations but ran more buses to ensure riders were not being passed by full buses and could reach destinations on time (the agency reduced service on some express routes and very low ridership routes to provide the vehicles).

All agencies prioritized cleaning and sanitization to keep riders safe. STA added a midday disinfection of vehicles to ensure large surfaces were clean for workers and riders throughout the day. The agency also provided riders with free masks, a cost that management deemed worthwhile to keep operators safe. The Port Authority partnered with local vendors to improve air circulation in rail cars. And when individuals with COVID-19 had traveled on transit vehicles or operators tested positive for the virus, agencies immediately quarantined buses, taking them out of service for a time.

SYSTEMS IMPROVED ACCESS TO HEALTH SERVICES

Several transit agencies took an additional step in combating the pandemic by connecting riders to COVID-19 testing and vaccination sites. Los Angeles Metro even used rail stations as health centers, thereby also helping to address the issue of inequitable access to health care services.

3. Handling Staffing and Material Shortages

The pandemic exacerbated staffing shortages and slowed access to essential materials. Agencies are thinking creatively about how to hire qualified staff and took innovative approaches to address the materials shortage.

AGENCIES FACE CHALLENGES MAINTAINING ADEQUATE STAFFING LEVELS

To provide safe and dependable service, transit agencies need enough workers to service and operate buses and trains. Before the pandemic, many of the agencies interviewed already had staff shortages because of retirements and other forms of attrition. In Denver, one staff member said the agency was “struggling with delivering service due to a lack of operators” and was “mandating that staff work a sixth day.”

The pandemic exacerbated these shortages. One issue that all agencies confronted in 2020 and 2021 was a rapid increase in private-market wages, which made their salaries less competitive. Transit operator and mechanic jobs also did not offer remote work or flexible hours—conditions that workers wanted both to stay healthy and to care for children in remote schooling.

At the same time, to keep employees safe, most transit agencies modified sick and leave policies, which increased operational costs and reduced available labor—even while holding the number of paid employees constant. Early in the pandemic, staff members with symptoms of COVID-19 were encouraged to stay home. If someone contracted the disease, agencies used contact tracing to identify staff members who may have been exposed and directed them to quarantine. Staff members were allowed to take paid time off if they had underlying health conditions or had family members for whom they needed to care. As a result, agencies were short-staffed but unable to fill the positions.

Some agencies faced large financial losses in the initial months of the pandemic because of reduced revenue from fares (although these concerns were alleviated as federal support came through). RTD temporarily laid off hundreds of workers to maintain financial stability (these workers were rehired when federal funding became available). Other agencies, including Metro, avoided layoffs by reducing bus and rail frequencies, which reduced the costs of parts, electricity, and fuel, while rightsizing service levels to the availability of operators and mechanics and to ridership demand. Some agencies recognized that gearing up to provide new service or rehiring might be difficult and thus worked to maintain their staffing numbers, although they too faced attrition because of the competitive employment market.

Agencies also faced longer-term hiring challenges. Retirement continued throughout the pandemic, with some workers retiring earlier than anticipated. Agencies struggled, and continue to struggle, to find qualified candidates to fill many operator and mechanic positions. The number of people in training classes for commercial driver’s licenses and other certifications needed to operate a bus or a train declined substantially.

We have had discussions about changing [reducing] our frequencies, not because of ridership, because the ridership is almost back, but because we don't have enough operators.

—Official at GRTC

As the pandemic continues to evolve, the five case-study agencies are ramping up hiring programs for drivers and mechanics through targeted advertisement campaigns. Human resources departments have worked with senior agency officials to develop “new ideas for both operations and maintenance hiring processes,” noted one Port Authority manager. Others are figuring out how to manage their budgets to offer higher wages, not only to match the competition but also to respond to increases in the cost of living (e.g., in Denver). Some agencies, including GRTC, have developed on-site commercial driver’s license programs to speed up permitting and licensing given slowdowns at the state department of motor vehicles.

WITH MATERIALS IN SHORT SUPPLY, SYSTEMS LEVERAGED IN-HOUSE TALENT

Early in the pandemic, organizations across the US faced shortages of personal protective equipment, sanitation supplies, and worker-safety materials. The transit agencies found creative ways to procure materials that would help reduce staff infection rates. For example, both RTD and STA leveraged internal resources such as machine shops to produce barriers to protect operators long before they could have procured them from private companies. RTD, for one, created 1,100 polycarbonate shields in its repair facility. RTD noted that it reached out to local nail salons (whose workers typically use masks) to find out whether they had masks they could donate to operators. GRTC worked with local distilleries to make sanitizer and local businesses to make masks. Noted one GRTC staffer, “our equipment department was becoming really creative.”

As the pandemic persists, transit agencies continue to face the negative effects of supply chain problems. For example, STA has been working to implement a bus rapid transit line, but a shortage in tube steel has affected the fabrication of station shelters and impacted the project schedule. STA is working with FTA to respond to these impacts.

AGENCIES FOCUSED RESOURCES ON ESSENTIAL PROGRAMS

The pandemic required that transit agencies focus on their essential function: moving riders. Transit agencies had to delay nonessential efforts like rebranding campaigns. Keeping workers and riders safe was the agencies’ primary focus, and agencies pivoted planning processes. For example, RTD continued with its Reimagine plan, which focused on reshaping transit services, but did so in a way that acknowledged the impact of the pandemic on changing outcomes. Metro launched new bus lanes and continued to pursue public-private partnerships that enabled new mobility options. It also implemented a bus network redesign effort named NextGen, designed to better match service to essential travel demands. The Port Authority modified its bus stop consolidation program to include more touchpoints and engagement with the community as part of the planning process. As agencies move forward, many are considering what routes and services they can provide reliably, given their staffing and resources.

4. Improving Communication with the Public

Inconsistent information and the broader uncertainty brought on by the pandemic made it an imperative for transit agencies to provide transparent information to the public. This required new approaches to ensure that transit policies were clear and reflected community needs and that rider behavior appropriately reflected new safety guidelines.

The pandemic showed a need for clear and confident communication. Riders do pay attention; they want to do the right thing and know we do, too. Our attitude moving forward is that they are not just customers, they are partners.

—Interviewee

TO BUILD CONFIDENCE, AGENCIES WERE TRANSPARENT WITH THE PUBLIC

Transit agencies were as open as possible about problems, communicating with the public through daily updates on their websites and social media accounts. Agencies even shared information about operator deaths from COVID-19 while protecting workers' privacy and ensuring accountability (though no evidence exists among the case-study agencies that operator deaths or disease resulted from circumstances within the transit environment). Metro expanded its communication approach through improved social media campaigns and signage to communicate about rules and available transit services. Metro staff also monitored customer feedback virtually and services in-person to understand how riders were responding. The Port Authority encouraged virtual public engagement through videos, tutorials, and announcements that connected with a greater diversity of people than the previous standard of in-person meetings. RTD began live streaming board meetings, with an eye toward more transparency.

AGENCIES IDENTIFIED NEW TACTICS FOR DEALING WITH RECALCITRANT RIDERS

Although some interviewees stated that riders mostly complied with agency rules, the primary sources of complaints or noncompliance were masking requirements. These rules were difficult to enforce, especially at the pandemic's start, because drivers could not rely on the police or other forms of authority for assistance until federal rules mandated that masks be worn. GRTC's approach was to instruct bus operators to pull over until recalcitrant passengers put on their masks. Interviewees noted that this approach was largely successful.

5. Building On Essential Federal Support

As of 2019, fares made up between 16 and 25 percent of the case-study agencies' total operating revenues, so the reduction in ridership brought on by the pandemic and the agencies' move to zero fares had a major impact on agency revenues.³² At the same time, operating expenses increased in many cases because of worker overtime. Federal recovery funds allowed agencies to continue providing an essential service.

DECLINING FARE REVENUES LEFT A MAJOR GAP IN AGENCY BUDGETS

State mandates that employees work remotely when possible and ongoing telework options for some private-sector workers led to reductions in transit ridership and fare revenue. In addition, each of the case-study agencies eliminated fares for a period, either to increase physical distances between operators and passengers or because they thought riders with low incomes would benefit from spending their limited cash on other necessities.

Despite declining revenue from fares, operational costs often increased. Agencies had to add costs for sanitation supplies for both riders and staff, as well as for materials for protective barriers. Because of worker shortages, health-related time off, and new cleaning expenses, several agencies' overtime expenditures rose. These factors affected agency budgets and decision-making. For example, as previously mentioned, RTD laid off almost 500 employees.

At the beginning of the pandemic, agencies funded with sales tax revenues expected significant declines in revenue. Experience from the Great Recession in the late 2000s suggested that the pandemic could reduce consumer expenditures and thus result in declining tax revenues. But federal stimulus checks and other social supports encouraged people to continue spending, so sales tax revenues continued to come in. As a result, agencies suffered less of a hit from declining tax revenues than from declining fare revenues.

FEDERAL OPERATIONAL SUPPORT FILLED GAPS

Staff at each case-study agency credited federal support provided through the Coronavirus Aid, Relief, and Economic Security Act (CARES, March 2020), the Consolidated Appropriations Act (December 2020), and the American Rescue Plan Act (March 2021) for keeping agencies open to provide service. These laws together provided \$69.5 billion for transit agencies nationwide to use in 2020 and later years. In a change from most previous federal assistance to large transit agencies, the funding could be used to cover operational costs (Freemark 2021).

For agencies like the Port Authority, the federal funding, combined with agency reserves, prevented budgetary concerns from being the only factor in decision-making. The additional support enabled the agencies to spend millions of dollars on the overtime required for operations to continue during the pandemic (though some of the agencies reduced services). With federal funds deployed to sustaining service, STA was able to avoid drawing down reserves, saving local tax revenues for future investments, and providing the agency the opportunity to develop a new strategic plan. For RTD, newly available federal funding filled gaps and allowed laid-off staff to be rehired, an essential step that enabled the agency to begin ramping up service.

We've asked to be treated as a service, not as a business; [we can] treat riders as receiving a service. Federal funding can be used [to achieve this].

—A Port Authority official

6. Changing Fare and Service Policies to Prioritize Core Riders

In 2020, social justice and equity issues rose to increased prominence for officials across the US, in part because of the widespread salience of the Black Lives Matter movement. Transit agencies had the opportunity to reconfigure their service and fare policies to better address systemic inequities in access faced by their core riders while ramping up operations to support the needs of essential workers. Transit agencies experimented with various solutions to better cater to the those who never stopped traveling for work.

TRANSIT AGENCIES INCREASED THEIR FOCUS ON SOCIAL EQUITY

Staff from each of the case-study agencies shared that the pandemic had altered their views on the role that transit plays in society. Many noted that public transportation services existed not simply to move people from one community to another but also, perhaps more importantly, to help their communities achieve greater social, racial, and environmental justice. Transit agency staff emphasized that they were building on federal requirements established through Title VI of the Civil Rights Act of 1964 but that the pandemic had elevated these concerns beyond meeting national standards.

During the course of the pandemic, we embarked on a strategic plan. We recognized through COVID that transit is critical...a lifeline service for people. We need to rethink the model. [Be] flexible and agile and listen to people.

—Agency CEO

Agency staff emphasized that people with low incomes, as the core customers, are the essential part of the fabric of transit agency service. Staff at Metro shared that most of their riders lack access to cars and therefore do not have other options to get around. During the pandemic, GRTC's ridership became largely made up of the essential workforce, which happened to be those people with the lowest incomes and with the most needs. And the agency responded in part by not only helping riders with low incomes but also looking to partner with other agencies and authorities to collectively address issues (e.g., using grants aimed for public housing to improve services for Richmond residents).

SYSTEMS ALTERED THEIR SERVICE PRIORITIES TO IMPROVE ACCESS

To respond to ridership changes during the pandemic more effectively and to better incorporate social equity into decision-making, agencies experimented with changing the frequency and availability of service. RTD learned that ridership was higher in neighborhoods with higher shares of people of color and families with low incomes and in industrial areas north of the city. The agency used automatic passenger counts—the product of counting systems integrated into bus and train doorways—to identify in real time which services were needed most.

Transit agencies experimented with reducing express service (particularly from more suburban areas to downtown cores or suburban tech hubs) and increasing local service. The Port Authority increased its service on local routes and extended service to important locations such as hospitals. RTD eliminated downtown service on some rail lines (though it maintained access via transfers to other lines), and instead of running trains more frequently, the agency ran longer trains. GRTC reduced local service only when operator shortages demanded it because those routes were used more by the essential workforce and people with low incomes. STA staff shared that the agency’s local route service reductions were limited and related to clear decreases in travel demand, such as to the university where in-person classes had stopped.

Metro officials noticed that many more trips were over short distances, in contrast with the extensive cross-regional trips that were common before the pandemic. They also noted that a greater share of trips occurred during off-peak hours, to key local institutions. RTD staff shared this assessment and cited hospitals as the type of important place that transit services should provide access to during the pandemic. Both agencies adjusted their route designs appropriately.

NEW APPROACHES TO SERVICE PROVISION OFFERED ACCESS TO NEW MARKETS

Transit agencies shifted service provision to other essential markets. With use of paratransit declining, STA leveraged unused capacity to deliver meals to older adults in partnership with a local non-profit agency. This change ensured that the agency’s vehicles were being used and its operators occupied while meeting an essential public need. At the same time, Metro introduced “Metro Micro” service, which took advantage of small vehicles like vans to provide affordable service to people not directly served by bus or train options. This system, which was slowly rolled out to neighborhoods across Los Angeles County, allowed passengers to board for \$1 when taking first- and last-mile trips to and from mainline routes.

AGENCIES EXPERIMENTED WITH LOWER OR NO FARES

All case-study transit agencies initially switched to zero fares to stop direct contact between passengers and transit operators. At the pandemic’s outset, GRTC and Metro saw the switch to fare-free as an opportunity to promote the idea that everyone, no matter their needs, has the right to a basic level of mobility. An official in Richmond said, “Many of the people who use the service make less than \$20,000; this is a way to ease the burden.” (Box 1 contains a detailed discussion of the benefits and costs of fare-free policies.)

The Port Authority did not explicitly advertise the shift to a zero-fare policy. RTD reinstated fares in July 2020. STA created a Community Access Pass program with local human services agencies to provide bus tickets to clients with low incomes at half the cost. Other agencies have considered similar fare reductions to ensure that transit services enhance the opportunity to build mobility for all.



BOX 1

The Pros and Cons of Zero-Fare Transit

Staff at GRTC emphasized that fare-free transit was a benefit to the local economy, riders, and operators. GRTC noted that even though eliminating fares reduced revenues, the agency expected to work with local and state political leaders, as well as the business community, higher education, and other regional institutions to fill the gap with enhanced funding from other sources. Overall, agency staff believe that making transit zero-fare enhances economic growth and community quality of life by improving the financial, economic, physical, and mental health of riders. Specifically, essential workers and low-income riders, who make up a majority of the system's users, are able to reallocate money they would otherwise spend on transit to needs such as food, health, and recreation. They are also able to expand their use of public transit to include more trips.

The long-term elimination of fares is likely one reason that ridership remained high in Richmond throughout the pandemic, although GRTC's ability to maintain high levels of bus service and to communicate well with the public probably also played a role. Indeed, in Los Angeles, free rides have not necessarily produced an increase in passengers, compared with what otherwise was expected, according to staff at Metro. This suggests that free rides alone may not result in an immediate uptick in ridership.

Zero-fare policies raise concerns for some agencies. STA staff emphasized that, philosophically, they and the agency's board members believed transit riders should contribute to the costs of their rides. According to officials at RTD and STA, fare-free travel encouraged people without a home to store their possessions on buses and trains and to use transit vehicles as places to spend the day. Staff members said these riders increased a feeling of insecurity among other passengers and sometimes damaged bus and train interiors.

Given the importance of maintaining a safe environment on transit, all the agencies are exploring how best to enforce standards of behavior. Agency staff almost universally noted that they wanted to reduce the reliance on police to remove passengers who had not paid or had acted inappropriately. Indeed, Port Authority eliminated police enforcement on its vehicles before the pandemic, and staff members from the agency felt that the change had been successful. A free-fare policy would make limiting police involvement with transit riders more feasible but would not eliminate the need to identify effective approaches to keeping riders safe.

More evidence is needed on the relative benefits of a zero-fare policy, not only to ridership but also to customer quality of life. In some cases, reduced fare options for people with low incomes may have the same effects—although those policies increase the administrative burden for agencies, which must determine eligibility. Fare-free policies might also be more effective if social support systems for people without homes and people with mental illness were more available in cities across the country. Transit agencies cannot do social service work on their own. Metro, for example, is working with a local nonprofit to provide riders without a fixed place to sleep, access to affordable housing and healthy food. But agency staff acknowledged that this work was simply “a drop in the bucket” given the high, and rising, number of people experiencing homelessness in Los Angeles.

Source: Interviews with officials from the five case-study transit agencies.

What Changes Can We Expect in the Post-Pandemic World?

In the previous sections, we explored pre-pandemic trends; detailed demographic, employment, and travel changes that resulted from the pandemic; and offered insights into how transit agencies reacted to the unforeseen changes that occurred in 2020 and 2021. These findings provide some indication of what we might expect in a post-pandemic environment. Some recent trends, such as an increase in telework, seem likely to have long-term relevance. Other trends, such as a reduction in peak-hour commuting, may end once the pandemic is no longer raging.

In this section, we detail some possible future trends in demographics, employment, and travel patterns that could influence demand for transit services in the coming years. We document what previous research theorizes about future trends, how such changes could influence the use and role of public transportation, and what these changes could mean for achieving more equitable outcomes. We also provide findings on how transit agency staff believe transit service and use will change.

Sketching Out a Post-Pandemic Society

Transit agencies must begin planning for an uncertain future. Although we do not know what awaits us, we can make reasonable guesses based on past experience. In table 4, we list hypothetical post-pandemic changes in demographics, employment, and travel patterns and whether they could benefit or hurt future transit ridership. Much like the changes we documented in other sections of the report, these trends are likely to vary between and even within communities. The choices made by policymakers will influence which of these trends happen. And though we emphasize transit ridership in Table 4, it is worth noting again that transit systems play a wide set of roles in the economy and society beyond simply providing trips to the maximum number of passengers.

TABLE 4

A Post-Pandemic World Could Mean Dramatic Changes in Why, and How, People Move Around

Potential futures for life and travel in urban environments

	Demographics	Employment	Travel patterns
Potentially beneficial to transit ridership	<ul style="list-style-type: none"> ▪ Living in dense neighborhoods becomes more popular ▪ Transit friendly communities becomes more affordable to families with low incomes ▪ People moving toward transit want transit accessibility 	<ul style="list-style-type: none"> ▪ Employment becomes more concentrated ▪ Working from home encourages conversion of downtown office space to residential space 	<ul style="list-style-type: none"> ▪ Travel extends to different parts of the workday, reducing peak congestion
Potentially deleterious to transit ridership	<ul style="list-style-type: none"> ▪ Living in suburban or rural neighborhoods becomes more popular ▪ Transit friendly communities experience gentrification 	<ul style="list-style-type: none"> ▪ Working from home becomes more prevalent, at least on some days of the week ▪ Employment becomes less concentrated ▪ White-collar workers become more likely to work from home, reducing the size of the service sector in downtown areas 	<ul style="list-style-type: none"> ▪ Desirability of shared modes declines because of health concerns ▪ Road congestion is reduced at peak times, clearing roads

Source: Authors' analysis.

Table 4 is intentionally filled with potentially contrasting trends. It may be that living in denser neighborhoods becomes more popular or that suburban living continues to be more attractive. Working from home could be a boon to transit systems that can serve all-day trips to neighborhood centers—or it could mean reduced peak trips to downtown, degrading public transportation’s chief market. In any case, we detail what research indicates thus far about which trends could play out in the sections that follow.

Demographic Patterns

The distribution of the US population may vary based on both where people want to live and who wants to live where and why. Here, we consider various ways metropolitan areas may change.

LOCATION AND HOUSING VALUES

One possibility in the post-pandemic world is that pre-pandemic trends resume and some combination of continued suburban and exurban growth *and* increased interest in centralization occurs. We could see more expensive city centers where highly educated people are likely to work from home and higher levels of suburban poverty. Each of these trends, in turn, could reduce demand for urban transit if it does not adjust to provide affordable, long-distance trips that meet the needs created by this population distribution. This is particularly relevant if largely on-site jobs, such as in manufacturing, health care, and retail, continue to decentralize.

Alternatively, a post-pandemic world could reverse preexisting trends. Demand for living in dense, urban communities could fall, and rents and property values in those communities could, too. This would replicate the decades-long disinvestment that occurred in some communities and that has been a continuous aspect of governance in US communities. This change could have positive and negative effects for transit systems. On the one hand, lower home prices in communities best served by transit could allow families with low, moderate, and middle incomes to live in neighborhoods that, until recently, have been gentrifying. On the other hand, such trends could reinforce the movement of jobs and other activities away from urban centers, pulling them farther from existing bus routes and fixed-guideway (rail or bus rapid transit) infrastructure. As we have seen over much of the last half-century, such changes could ultimately reduce transit ridership.

AGE AND WEALTH DISTRIBUTION

The age distribution of the population influences travel patterns within a community. For example, people older than 65 typically travel considerably less than younger people, in part because they are less likely to need to commute to work (Giuliano, Hu, and Lee 2003). More older people in a community could reduce transit ridership to jobs.

Similarly, an increasing number of wealthy people in a community may be associated with more car trips and fewer transit trips, and the inverse for an increase in residents with lower incomes. On the other hand, if urban centers become more accommodating to households with lower incomes—either through the development of more affordable housing or a decline in property values and rents—transit ridership in urban centers may rise because of residents' demand for affordable transportation options that do not involve automobiles.

Employment Patterns

Changes in demographic patterns may be strongly influenced by shifts in employment standards. The pandemic changed expectations about what working arrangements were possible, instilling in many the idea that working from home could be a permanent feature of post-pandemic life. On the other hand, a considerable share of Americans will continue heading to the office, the factory floor, the hospital, or the retail shop in the coming decades.

WORK FROM HOME

The rise of web-connected workplaces over the past few decades has encouraged more Americans to telework, but not until the pandemic was a large share of workers affected. Many took up teleworking as a useful mode of employment (Davis, Ghent, and Gregory 2021). Recent surveys suggest that employees value the ability to work flexible hours because it allows them to meet the demands of family members and avoid rush hour.³³ People who have historically faced challenges entering the workforce, such as women with young children, may benefit from a home office if it means they can balance domestic and employment needs (Couch, O’Sullivan, and Malatzky 2021). Indeed, more than half of employees would prefer to work remotely at least three days a week.³⁴ In a tight labor market, this means that employers who offer such options may have more success recruiting new talent (Kramer and Kramer 2020).

Employers have mostly accepted remote work. The shared pandemic experience has allowed both workers and job providers to adapt; the fixed costs of regularizing working from home have already been paid (Gupta 2020). A recent survey found that most companies had successfully shifted to remote work and that most expected to leverage teleworking to make a long-term change in their real-estate strategies—for example, by renting less office space.³⁵ Many companies believe remote work is feasible and potentially efficient in terms of productivity (Jung and Silva 2021). Both employees and employers may save money if working from home is allowed, not only because of reductions in the need for office space but also because workers could commute less and choose to live in areas with less expensive homes.³⁶ And some evidence exists that teleworking increases employee happiness (Ice, Rieley, and Rinde 2021).

Only a portion of all jobs, however, can be performed through telework. Previous estimates of the distribution of work in the US indicate that 37 percent of jobs can be performed entirely at home; these jobs also account for a disproportionate share of national wages (Dingel and Neiman 2020). Other estimates suggest that a majority of jobs could allow for at least some at-home employment,³⁷ although a majority of workers believes they will return to in-person employment once the pandemic ebbs (Salon et al. 2021).³⁸ One possibility is that working in person occurs only on certain days of the week or at certain times of the day. The degree to which such changes occur is likely to vary by job and place. In either case, the rise of teleworking—either permanent or occasional—could result in a decline in transit ridership if transit agencies do not respond by adjusting services to meet new demands.

CHANGES BY SECTOR

The differences in job sectors are key to understanding the future of employment. People in management, professional, administrative, information, financial, business services, and public administration positions will likely be able to work from home (Ice, Rieley, and Rinde 2021). These white-collar office jobs may transition to a teleworking environment over the long term if it becomes clear that the benefits of agglomeration apply even when people work virtually. Office jobs that become remote may affect other jobs. For example, consider a downtown that was a financial services center before the pandemic. If the area loses some of these workers, the businesses that support them—such as dry cleaners, restaurants, and printing businesses—would suffer, and some of their workers could lose their jobs. At the same time, neighborhood businesses serving workers at home—such as restaurants and corner stores—could increase.

Regardless of which trends pick up after the pandemic, around half of jobs will likely continue to require in-person work. People in manufacturing, industrial, transportation, health care, food services, and education jobs will need to work in person. Overall, people holding jobs that require in-person employment are more likely than people with jobs that can be performed from home to be paid less, to rent, and to work for smaller firms (Mongey and Weinberg 2020). The work hours for these jobs are also less likely to be the typical 9 a.m. to 5 p.m. of jobs in financial services or government, and the positions are more likely to be held by people of color.

LOCATION OF IN-PERSON JOBS

How likely different sectors' jobs are to have work-from-home options will probably affect how jobs are distributed spatially. Many jobs likely to become permanently remote, including those in financial services or government, have traditionally been in downtown areas. On the other hand, many of the jobs likely to remain in-person are either distributed across urban environments (such as those in health care, education, or food service) or are at the suburban or exurban edge (such as those in manufacturing, industrial work, or transportation). These distributions are likely to have major consequences for public transit systems, because public transportation across the US has historically been most cost-effective when serving workers who travel to and from downtown jobs at peak hours.

On the other hand, changing trends in employment location could provide new opportunities for transit services. As we discuss in the next chapter, public transportation options that prioritize riders who work in jobs that remain in-person, who work in jobs that are distributed across metropolitan areas, and who work less uniform hours may ultimately be just as or more effective than services focused on downtown commutes.

Travel Patterns

Future changes in travel patterns will undoubtedly reflect changes in employment and demographic patterns. Recent surveys suggest that the pandemic's long-term impacts may include a roughly 40 percent decline in public transportation use, with many shifting away from trains and buses and toward cars, bikes, or telework (Salon et al. 2021). On the other hand, well-planned transit services could adapt to societal changes and create new and popular options for riders.

TRAVEL LOCATIONS AND TIMES

Because of the increase in the share of Americans working from home, the peak-hour, peak-direction trips that characterized commuting in so many US cities became less frequent. But such changes may have been temporary; peak-hour travel appears to be returning to its pre-pandemic heights. However, if the working from home trend continues, more travel is expected to occur midday and between neighborhoods. A strengthened transit network that prioritizes such travel could provide a seamless experience and attract more people to buses and trains.³⁹

MODE DESIRABILITY

Major features of US cities' pandemic responses were temporary "open streets" events, during which pedestrians were invited into lanes that were previously reserved for automobiles, and the development of lanes for cyclists and users of scooters. Both features—some of which have been made permanent—may encourage a long-term shift toward these modes of mobility.⁴⁰ Because walking and biking can be both complements to and replacements for transit use, whether they will ultimately benefit or detract from public transportation ridership is unclear.

The pandemic also may be associated with changing views about ride hailing use. During the pandemic, use of ride-hailing services—especially for pooled trips—declined dramatically (Du and Rakha 2020). This shift may be in part the result of concerns about disease exposure and a general decline in trip taking, both of which may ultimately be reversed in a post-pandemic world. On the other hand, interest among residents in ride-hailing services could decline after their rise in the 2010s.

PERSISTENT CONCERNS ABOUT DISEASE EXPOSURE

Widespread concern that transit services were unsafe may also have contributed to the declines in ridership during the pandemic. Even though agency officials worked to demonstrate that bus and train options were clean and unlikely to be disease vectors, uninformed and unproven claims that density and transit were causing disease transmission, especially early in the pandemic, undoubtedly discouraged some people from using transit.

Over the long term, the willingness of Americans to take mass transit will depend to some degree on whether these concerns are addressed. If, for example, claims that the public transportation environment is unhealthy are reinforced over time, people could increase their use of cars and other individualized modes of transportation. On the other hand, the work of transit agencies to improve ventilation and cleaning protocols could convince people to return to transit. In Asia, strong cleaning protocols and ventilation improvements helped maintain transit ridership levels during the pandemic despite public health concerns that encouraged many residents to continue wearing masks.⁴¹ Similar social mores could eventually characterize travel in the US as well.

Survey Results: Transit Agency Views on the Future of Transit Services

Transit agency employees already have a sense of how they might respond to changing conditions in the coming years. Our web survey of transit officials across North America asked agency staff members about their long-term expectations for various travel trends.

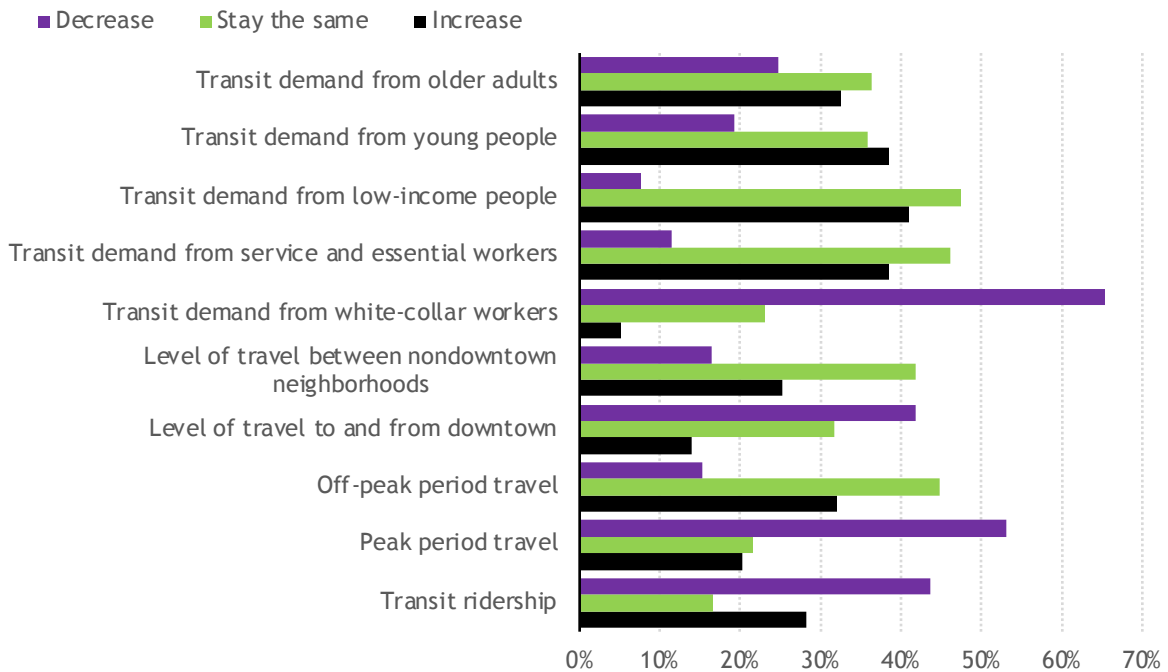
More agencies said they expect overall transit ridership to decrease (44 percent) than said they expect it to increase (28 percent). And a relative consensus emerged among the surveyed agencies that the demand for transit from white-collar workers will decrease (65 percent said it will drop, while 5 percent expect it to increase). The explanation for this expectation is likely that many white-collar workers will have the option of working remotely. Conversely, most agencies expect the demand for transit from people with low incomes, who are more likely to be required to work in-person and to not have access to an automobile, will remain the same or increase (88 percent). More agencies expect the demand for transit from young people to increase (38 percent said it will go up, while 19 percent expect it to decrease). The opinions on the future demand for transit from older adults are roughly split.

Our survey also revealed that more agencies said they expect peak-period travel to drop (53 percent) than said they expect it to increase (20 percent). And more agency staff said they expect travel to and from downtown to decrease (42 percent) than said they expect it to increase (14 percent). Most respondents said they expect travel between neighborhoods outside downtown to remain the same or increase (67 percent). A stronger consensus can be seen on peak-period travel: 53 percent of agency respondents expect it to decrease, while 42 percent expect off-peak travel to remain the same or increase. This is consistent with our interviews, in which transit officials said remote work has enabled more people to travel within traditional working hours—for example to run errands.

FIGURE 15

Agencies Are Pessimistic About a Return of White-Collar Workers, but Many Expect Demand Will Increase from People Who Are Young, Hold Essential Jobs, and Have Low Incomes

Responses to survey of transit agencies, summer 2021



Source: Survey of American Public Transportation Association members.
Note: Chart excludes “not sure/prefer not to answer” responses.

Recommendations

The pandemic threatened the survival of transit providers across North America. They lost millions of riders and struggled with inadequate staffing and health threats. But thanks to creative thinking and federal support, they ensured mobility for essential workers, families with low incomes, and other bus and train riders every day while keeping their employees on the job. From this perspective, transit agencies and their staff should be lauded. But more work is needed to build on this achievement. For transit agencies, success can take many forms: increasing ridership, guaranteeing an equitable and just level of access for the most vulnerable members of society, helping ensure a sustainable transition away from a carbon-emitting society. The choices that transit agencies make can help determine whether pre-pandemic trends are reinforced or reversed.

We have structured our recommendations around the twin goals of better preparing transit agencies for future emergency situations such as the COVID-19 pandemic and increasing access for all. Based on practices identified in this study, we make four recommendations that we believe transit agencies would benefit from incorporating into their planning and operations. These are approaches that agencies can take to inform decisions about service, policy, and investment in the coming years:

- Institutionalize best practices from the pandemic period
- Plan and operate more effectively by prioritizing social equity
- Leverage opportunities to expand ridership
- Keep abreast of changing trends

In each case, these recommendations require action from other organizations involved in matters related to public transportation provision, like local governments, metropolitan planning organizations, and states. All must be involved to ensure that transit systems power out of the pandemic with more riders and more equitable results. They must also guarantee that agencies can continue to operate during difficult times, when revenues decline but expenses persist. Their work is essential to ensuring that transit systems can remain creative and respond to emergencies.

Institutionalize Best Practices from the Pandemic Period

The crisis brought on by the pandemic involved great loss among communities across North America and threatened the ability of transit agencies to guarantee adequate access for all. Yet agencies' actions during the pandemic—as illustrated by the five case studies in this report—demonstrated that bus and train operators can respond conscientiously and effectively to an uncertain environment. Transit agencies should adopt best practices learned during this period of crisis.

Improve Partnerships with Labor

Transit agencies faced challenges keeping staff coming to work, not only because of the health emergency but also because of increases in private-sector wages. Nevertheless, management at several of the agencies

we profiled improved their relationships with workers in 2020 and 2021. First, agencies with unions identified key areas of agreement on creative ways to redeploy workers in the face of material and staff shortages. Maintaining these collaborations can help ensure that employees are engaged and do not feel that changes are coming out of nowhere. Second, agencies improved their day-to-day communications with staff. This included the creation of Facebook messaging and texting channels that allowed managers to better understand which staff members were available and what needs they had. The combination of formal and informal approaches to seeking feedback can improve responses to sudden changes.

Improve Community Engagement

The pandemic initially shut down efforts to engage with the public as agencies scrambled to respond to the crisis. But as the pandemic continued, transit organizations developed new approaches to working with the public. Agencies increased public communications. And operators expanded outreach through virtual meetings, helping ensure that residents could participate in decision-making. Better engagement can also lead to the identification of community needs. STA, for example, learned that it needed to improve access for older adults. It then reassigned paratransit vehicles to help them access health care, recreation, and other needs. Transit agencies should continue similar efforts.

Ramp Up Hiring for Operators and Mechanics

Because of rapid increases in private-sector wages, agencies may have to find ways to increase pay beyond what was previously considered reasonable for their jobs. They must develop strategies to attract trainees through operator and mechanics courses, which are pipelines for future employees but shrank during the pandemic. Agencies must also work with state governments to allow on-site commercial driver's licensing. Agencies should highlight the positive aspects of working in the public transportation industry, including job stability, good benefits, and union membership.

Develop New Efforts to Address Potential Future Materials Shortages

Officials may consider assessing and quantifying the materials needed to keep buses and trains running and then establishing an approach to warehousing enough materials so that agencies could maintain service for several months without additional purchasing.

Expand Sanitation Measures

Early in the pandemic, public health authorities claimed that people could contract COVID-19 from touching surfaces and recommended considerable cleaning. Transit agencies responded by expanding cleaning protocols, including with midday shifts and temporary staff. More recent evidence shows that the disease is unlikely to be spread by touching and that ventilation (which agencies also invested in improving) is more important.⁴² Nonetheless, more frequent cleaning more improved the customer experience, making riders feel more welcome. Agencies should expand their sanitation measures with the goal of ensuring higher ride quality.

Operate More Effectively by Prioritizing Social Equity

During the pandemic, transit systems in the US ensured that essential workers could get to their jobs in grocery stores, hospitals, and public agencies. Yet the US transportation system has been persistently inequitable, limiting the mobility of families with low incomes and people of color even though they deserve equal access and often perform critical work. Public transportation agencies must prioritize social equity in their planning and operational choices to help remediate this situation.

Prioritizing social equity means thinking strategically and proactively about who is being served by bus and train options today—and who might be better served in the future. A 2021 report from TransitCenter and the Center for Neighborhood Technology titled *Equity in Practice: A Guidebook for Transit Agencies* provides a useful overview for how agencies might think and act equitably, arguing that transit agencies should articulate a vision for more equitable services and then act on it by prioritizing resources for marginalized and vulnerable people. This requires a change in agency culture, and our interviews suggest this change is already occurring in many agencies. In this section, we highlight several ways that agencies can effectively think and act on behalf of social equity.

Define Success as More Than Ridership

Interviewees from the five case-study agencies emphasized that the pandemic and the Black Lives Matter movement had altered their perceptions of why they were providing transit services in the first place. According to officials at the Port Authority, for example, the agency learned it needed to think of transit less as a business and more as an essential service that provides high-quality rides for everyone who uses it. For agencies looking for inspiration, that means finding ways to ensure that even the most marginalized members of society have access to reliable, convenient, affordable, and fast ways to get around, not necessarily focusing on improving service for the largest number of people or for the most privileged.

Identify People and Communities That Have Faced Inequitable Access to Opportunity

Making progress toward socially equitable transit access requires identifying which people and communities are most vulnerable to a lack of transit access—and whose livelihoods would be most improved by expanding service. Conducting such an investigation requires detailed mapping of current access to opportunity, such as to jobs, recreation, schools, and health care, within transit service areas. It requires identifying differences in access times by modes of transportation, such as by transit or by car. Finally, it requires agencies to identify where jobs are located, particularly for families with low incomes and people of color. This baseline evaluation is necessary not only to meet federal Title VI civil rights requirements but also to help agencies identify how to reorient services and investments.

Reallocate Resources toward Vulnerable People, Underserved Neighborhoods, and Essential Workplaces

Harnessing evidence offered by a systemic access analysis, transit agencies should work to ensure that bus and train service best serves the communities that most need better access to transportation. This effort can

take several forms. One approach could be to alter the balance between the hub-and-spoke network that characterizes most US transit systems and a network that offers neighborhood-to-neighborhood access. This new approach could respond to changing commuting patterns and create better options for people who do not work in downtowns (National Association of City Transportation Officials 2020).⁴³

Transit agencies may also want to consider adapting their services to different needs on different days of the week and different times of the day. Making bus and train options that work for people all day, late at night, and on weekends is essential for ensuring connectivity. If ridership is less concentrated at peak times than it once was, transit agencies may save money by reallocating resources to improve all-day service.

Transit agencies should harness these same lessons to improve their capital planning programs. New bus rapid transit lines and rail routes will continue to play an important role; indeed, with new federal funding, there may be more money than ever to invest in them. But capital projects must emphasize the needs of families with low incomes and people of color—particularly those living in communities with relatively poor access to opportunity—so outcomes can be linked with the goal of building social equity. In some cases, this could mean piloting service to suburban job centers or to dense urban communities with relatively high levels of poverty.

Realign Services to Best Meet the Needs of the Traveling Public

Our research demonstrates that the pandemic affected public transportation services in different ways. Local bus services—particularly those that provide access to communities with high numbers of essential workers and families with low incomes and people of color—maintained much of their pre-pandemic ridership, suggesting their continued importance. On the other hand, demand for express bus options and commuter rail services fell. Public transit agencies should learn from this experience and align service patterns to best meet the needs of the traveling public.

This alignment can occur in several ways. Now that teleworking is more common, for example, peak-hour, peak-direction commuter rail trips to and from downtown may not offer as great a societal benefit as before.⁴⁴ But that does not mean such routes should be jettisoned. Rather, it suggests they be modified to offer frequent two-way service all day that is affordable for all. Such commuter service could benefit people of all backgrounds in a way that lines that operate only at peak times, at a fare higher than local bus service, do not.

Agencies may also consider reorienting paratransit services to provide more transit products. Our case-study agencies used paratransit vehicles to supplement bus service or to provide new travel options for older adults. Given paratransit's high per-trip cost, agencies could be creative in harnessing such vehicles and their drivers in areas that lack better transit options. They could also do more to market these services as broader first- or last-mile connectors (TransitCenter 2019).⁴⁵ A combination paratransit-micromobility program may serve more passengers more effectively than do paratransit services on their own.

For bus services, considerable work remains to improve their usefulness for the traveling public. Many recent redesigns of bus networks emphasize frequent all-day service to improve access to opportunity. This approach reflects the reality that essential workers rarely work the same hours as wealthier white-collar employees (Fried 2020). Local service can transform into a “show-up-and-go” option that guarantees short waits for the next bus.

Provide Opportunities for Meaningful Involvement in Decision-making by All

Expanding social equity means giving the public opportunities to participate in decision-making related to the planning and operations of transit agencies. The agencies we interviewed for our study emphasized that the pandemic offered opportunities to expand outreach through virtual engagement. These mechanisms, combined with renewed in-person processes, can help agencies learn what is working well and what is not. In some cases, agencies must build on their current approaches to ensure adequately representative participation. Examples include paying participants with low incomes for their time, partnering with trusted community groups, and weighting surveys for population representativeness to make up for gaps in participation.

Leverage Opportunities to Expand Ridership

Even though ridership fell during the pandemic, transit agencies have an opportunity to expand their user base. Bus and train systems have room to grow⁴⁶—and they can leverage best practices to expand their ridership. Doing so would be good for the environment, improve agencies' financial sustainability, and encourage economic revitalization in cities. A ridership growth strategy must acknowledge that we do not have to, and likely will not, return to pre-pandemic business as usual. The growth in teleworking, for example, improved the lives of millions of people by allowing them to avoid commuting. And the budding recognition among policymakers and transit agency management of the need to integrate social justice into the very core of transit planning and operations indicates a new approach to prioritizing investments.

Focus on Opportunities to Make Transit a Good Choice for Everyone

Making transit more attractive to more people could mean lowering barriers to access, such as a lack of information about how to ride. A transit agency CEO we interviewed said, "Our theory is that people don't have to marry us; they can just date us." Her point was that transit should be easy to try—not give people the impression a long-term commitment was needed before getting on board. Staff pointed out opportunities to increase the public's understanding of how to ride transit. The Port Authority showed off a bus at a car show. At RTD, staff partnered with businesses to carry attendees to downtown events, which had the added benefit of bringing people downtown during the pandemic. These approaches allowed people unfamiliar with transit to understand what it was like to use it.

One official noted that many people do not know how to pay for transit. The agency was investigating working with a utility company to distribute fare cards to all customers with their billing statements. Transit agencies should also consider fare discounts for riders who will jump on if given the opportunity. Metro, for example, is piloting free passes for children. STA is considering collaborating with downtown apartment managers to provide transit passes to tenants as an incentive for living in certain units.

Increase Efforts to Link Transit with Equitable Transit-Oriented Development

Ridership is dependent to a large degree on the presence of workers and residents adjacent to transit lines. Transit agencies should partner with developers to coordinate planning new projects that are along bus and

train routes and provide easy walking access to them. Agencies should acknowledge that in some cases, the most effective transit-oriented development are those that provide affordable housing, because residents with low or moderate incomes are more likely to ride buses and trains than people with higher incomes.

Develop Engaged, Long-Term Relationships with Other Government Actors

Federal, state, and local governments must identify new funds to help transit agencies expand access to mobility. Local governments could work with agencies to build bus and train ridership. To encourage dense new housing near transit stations, they can reform zoning ordinances, including by reducing parking requirements and allowing more housing units per lot. And they can redesign streets to prioritize pedestrians so neighborhoods are more welcoming for people walking to the bus or train.

Keep Abreast of Changing Trends

Transit agencies cannot predict how the future will change their operating environment. That said, they can work carefully to monitor many of the trends we have identified in this report. In this section, we highlight key potential changes in demographics, employment, and travel patterns (many of which run in opposite directions) and offer strategies that agencies could adopt to address these changes and add more riders.

Remote Work

- If the number of people telecommuting increases, transit agencies should reconsider their core services to downtown and explore reducing peak-period frequencies if they have adequate evidence that full ridership will not return during those hours. They should evaluate expansions of neighborhood-to-neighborhood service, including to suburban areas that previously lacked transit, while expanding all-day service community-wide.
- If we return to pre-pandemic levels of telecommuting, agencies should reinforce core routes, ensuring that they keep up with the growth of in-person jobs. They should identify employment zones that are underserved by bus and train routes and ensure that they are offering service to meet worker demands. This could mean canvassing employers to identify when shifts occur.

Automobile Traffic

- If automobile traffic increases, transit agencies can demonstrate their value in offering riders an escape from hours of commuting by car. Agencies must carefully calibrate service schedules to match realistic travel times for buses stuck behind cars and work with local governments to expand bus-only travel corridors.

Real-Estate Demand

- If property investment in central-city areas increases, transit agencies should work with local governments and housing developers to increase the amount of affordable housing constructed adjacent to transit stations to create a built-in ridership base. Increased investment in central cities is good for transit agencies in that it hits their core market. Yet such investment may also encourage gentrification, which could reduce the share of local residents who are transit users.
- If market demand in downtowns and adjacent neighborhoods declines, agencies should work to ensure that good service to these communities continues as a way of guaranteeing equitable access to mobility. Declining demand could be difficult for transit agencies, but it also offers opportunities to enhance accessibility for families who have low or moderate incomes and are newly able to afford to live near bus and train service.
- If development in suburban communities increases, agencies should negotiate with local governments to identify new funding and form partnerships with developers to ensure that new construction is designed to account for the needs of transit users. Growth in suburban residential and employment environments should be associated with new transit service, especially when that growth occurs in communities with high shares of residents who have low incomes and are people of color.

Attitudes about Social Distancing

- If the public continues to be concerned about becoming infected with COVID-19 or other diseases, transit agencies must respond attentively. First, they must show a continued focus on cleanliness and emphasizing that passengers wear masks or other personal protective equipment. Given the low cost of surgical masks, transit agencies should consider distributing them for free on all buses and trains. Second, the public transportation industry must work with public relations firms and the media to continue spreading the message that transit is not a proven vector of disease and passengers should feel comfortable using it.

Agencies should closely monitor each of these trends, with help from other public agencies and national organizations like APTA, to ensure that they can adapt their services to future needs. They should collect data from third-party sources and their own systems, such as automatic passenger counters. No community, or the transit system that serves it, will experience the same transitions over time. Being careful about planning in context and creating space for creativity are therefore vital to achieving successful results.

Appendix A. Online Survey Questions

1. **Do you consent to participate in this survey?**
 - Yes
 - No
2. **Please enter the name of the transit agency you work for**
3. **Please enter your name and position within this agency**
4. **Please enter your work email address**
5. **Did your agency reduce transit service levels during the pandemic period (beginning March 2020), as compared to service during 2019?**
 - No
 - Yes
 - Not sure / Prefer not to answer
6. **Why did your agency choose to reduce service levels?** Select all that apply.
 - a. Reduced ridership demand
 - b. Avoid economic losses
 - c. Staff sickness
 - d. Limited ability to hire new staff
 - e. Inadequate funding
 - f. Other [please explain]
 - g. Not sure / Prefer not to answer
7. **Do you have plans to return to full service?**
 - Yes, we have plans to return to full service
 - Yes, we already have returned to full service
 - No plans to return to full service yet
 - Not sure / Prefer not to answer
8. **When do you plan to return to full service?**
 - During 2021
 - During 2022
 - During 2023 or after
 - Not sure / Prefer not to answer
9. **What are your current service levels, as a percentage of your weekday service pre-COVID-19?**
 - More than 100% of pre-COVID levels
 - 90-100%
 - 75-90%
 - 50-75%
 - 25-50%
 - Less than 25%
 - 0% (Not providing service)
 - Not sure / Prefer not to answer

10. Which of the following actions have you already taken, if any, due to the COVID-19 pandemic?

Select all that apply.

- a. Furloughed staff
- b. Laid off staff
- c. Cut service
- d. Eliminated routes
- e. Reduced days of service
- f. Re-instituted fares after fare-free period
- g. Delayed, deferred, or cancelled vehicle purchases
- h. Delayed, deferred, or cancelled capital projects
- i. Other actions
- j. No actions have been taken
- k. Not sure / Prefer not to answer

11. Given your agency’s current funding situation, which of the following actions, if any, are you considering over the next year? Select all that apply.

- a. Furloughing staff
- b. Laying off staff
- c. Cutting service
- d. Eliminating routes
- e. Reducing days of service
- f. Increasing fares
- g. Delaying, deferring, or cancelling vehicle purchases
- h. Delaying, deferring, or cancelling capital projects
- i. Other actions
- j. No actions are being considered
- k. Not sure / Prefer not to answer

12. How does your agency expect any of the following to change in your jurisdiction over the long-term in the post-Covid-19 environment, as compared to the pre-pandemic (2019) environment?

	Increase	Stay the same	Decrease	Not sure / Prefer not to answer
Transit ridership	•	•	•	•
Peak period travel	•	•	•	•
Off-peak period travel	•	•	•	•
Level of travel to and from downtown	•	•	•	•
Level of travel between non-downtown neighborhoods	•	•	•	•
Transit demand from white-collar workers	•	•	•	•
Transit demand from service and essential workers	•	•	•	•
Transit demand from low-income people	•	•	•	•
Transit demand from young people	•	•	•	•
Transit demand from seniors	•	•	•	•

In this section we will ask about service options that your agency is already considering in response to post-pandemic changes in travel needs and patterns. Please check all the applicable options under each section.

13. What changes is your agency considering regarding level of service overall?

- Increase service overall
- Decrease service overall
- No change in service overall
- Not sure / Prefer not to answer

14. What changes is your agency considering in fare policy? Select all that apply

- a. Reduction in fares
- b. Increase in fares
- c. Provision of low-cost fares for low-income people, youth, seniors, and/or others
- d. No changes are being considered
- e. Not sure / Prefer not to answer

15. What changes is your agency considering in service geography? Select all that apply

- a. Increase in downtown service
- b. Decrease in downtown service
- c. Increase in neighborhood-to-neighborhood service
- d. Decrease in neighborhood-to-neighborhood service
- e. No change is being considered
- f. Not sure / Prefer not to answer

16. What changes is your agency considering in service times? Select all that apply

- a. Increase in service during peak periods
- b. Decrease in service during peak periods
- c. Increase in service during off-peak periods
- d. Decrease in service during off-peak periods
- e. No change is being considered
- f. Not sure / Prefer not to answer

17. Is your agency considering replacement of fixed-route bus or rail service with on-demand services?

- Yes
- No
- Not sure / Prefer not to answer

18. What changes is your agency considering in capital investment?

- a. Increased investment in rolling stock
- b. Decreased investment in rolling stock
- c. Increased investment in stations and bus stops
- d. Decreased investment in stations and bus stops
- e. Increased investment in fixed-guideway bus and rail projects
- f. Decreased investment in fixed-guideway bus and rail projects
- g. No change is being considered
- h. Not sure / Prefer not to answer

19. Regardless of resources, what should your transit agency do to be able to attract additional ridership in the post-pandemic period?

20. What does your transit agency need to be able to attract additional ridership in the post-pandemic period?

Appendix B. Interview Protocol

Introduction

Hello, _____, thanks for agreeing to speak with us today. I'm ____ and this is my colleague _____. We are research staff of the Urban Institute, a nonprofit, nonpartisan research organization in Washington, DC.

The data we collect today will be used to inform our work with the American Public Transportation Association's (APTA) in identifying best practices for reshaping transit services in the context of a post-pandemic environment.

Your participation in this discussion is completely voluntary and everything you tell us will be kept in the strictest confidence. You may decline to participate, choose not to answer any specific questions, or stop the conversation at any time. Please let us know if at any time you'd like something you say to be "off the record."

We will not link any data to your name or quote you without your review and permission. You should be aware that due to your specialized perspective/expertise, and because we are talking to a small number of people, some may attribute information to you, and it may be possible to identify your comments. We make every effort to avoid this, but you should be aware of the possibility. Therefore, please be mindful of specific information you give that could pose a reputational risk.

[If more than one interviewee]

We must emphasize that we cannot offer you complete confidentiality because multiple people are participating, and we cannot control what might be reported outside of this conversation that a participant said (or someone thought they said). We therefore ask that you respect other participants' confidentiality by not sharing things that are said after the discussion is over, and please refrain from taking any screenshots or other recordings of the discussion.

[If Zoom (or another virtual platform) interview]

We strongly recommend that you participate today from a private setting, outside the eye or earshot of non-participants, including family members. We also recognize that video meetings can be hacked, or other technical issues may arise. Although we have taken steps to avoid this from happening, this is a potential risk to keep in mind. For these reasons, we cannot guarantee confidentiality.

We anticipate this discussion will last no more than 60 minutes.

Do you have any questions?

[Pause for questions.]

Consent

- Do you agree to participate? Are you comfortable with this interview being recorded?
- Do you have any questions before we begin?

Interview Questions

Section I: Interviewee role and background, and pre-COVID conditions

- May you please share a brief overview of your background and your role and responsibilities in the transit agency?
- Before the pandemic, what was transportation like in your service area? What were ridership patterns like? What new initiatives were you trying that were interrupted or accelerated by the pandemic?

Section II: Pandemic impact

- **What were the most evident impacts from COVID in the service area served by your transit agency?**
 - During 2020? During 2021? Currently?
 - Probe: Impact on employment, housing, and quality of life
- **What were the major impacts from COVID on your transit agency?**
 - During 2020? During the first half of 2021? Currently?
 - Impact on the budget?
 - Impact on ridership?
 - Impact on travel patterns?
 - Impact on ability to provide service? (e.g., staffing availability)

Section III: Dealing with the pandemic

- **What changes did your transit agency make in response to the beginning of the pandemic? What changes were made later on in the pandemic?**
 - Probe: Changes in bus routes, train frequencies, fare structures, rider amenities, payroll
 - What were the goals for these changes?
- **What data or other information informed these decisions?**
- **What challenges did the agency face in making these changes?**
 - Probe: Were there competing demands that you had to address or balance? For example, how did you balance rapid response with transparency?

- **How did equity play a role in these decisions? Were there specific considerations in relation to the racial or income makeup of the service area? Essential workers?**
- Probe: How have those changes influenced access to mobility particularly for people who are essential workers or low-income?
- **Looking back, were these the right decisions? What would you have done differently?**
- **How do you measure success? Did the pandemic cause you to redefine your views of success? What accomplishment are your proudest of?**

Section IV: Planning for the future

- **Looking into the post-pandemic future, do you foresee any lasting changes in travel patterns in the areas served by your transit agency?**
 - Probe: What role do you think telework/work-from-home will play in your service area?
- **What impacts do you think these patterns will have on public transportation use in your service area?**
 - Probe: What types of trips will decrease in frequency? What types of trips will increase in frequency? How have the characteristics of your riders changed?
- **Does your transit agency have plans for the future to respond to these changes? What role do you see your transit agency playing in shaping the future of travel in your region?**
- **How will you measure success? Is this measurement different than how you might have defined success in the past?**
- **If you had a magic wand, what else is needed to address post-pandemic transportation needs in your service area?**
 - Probe: What additional funding will be needed to make the necessary service changes in the long term?

Finally, in reflecting on your experience through the pandemic, what recommendations would you have for other similar transit agencies as they plan for post-pandemic travel?

Appendix C. Comparative Analysis of Survey Responses

Using data from the web survey we described above, we categorized agencies by their size, both in terms of the populations of the metropolitan areas they serve and their service provided, in terms of vehicle miles traveled (VMT), to better understand potential differences in their current and expected service levels. Large agencies by population are those that serve geographies with more than 1 million residents and small agencies are those serving areas with less than 100,000 people, according to 2019 American Community Survey data. In terms of VMT, we categorized agencies as large if their annual VMTs were above 1 million and small if they were below 150,000, according to 2019 data from the National Transit Database.

We found that the 27 largest agencies by population served reported average higher service levels as of the survey (summer 2021). Almost half of them (48 percent) reported already operating at 90 percent or more of their pre-pandemic levels of service. Only 17 percent of the 12 small agencies by population, on the other hand, reported the same. These differences were also found between agencies with high and low VMTs. Nine of the 12 agencies with high VMTs reported operating at 90 percent or more of pre-pandemic service levels, while only three of the 11 agencies with low VMTs did so. Prospects for future service levels in smaller agencies appear to be better, as shown in Table 5. It is important to note, however, that sample sizes are small for some categories, so these data should not be interpreted as meaningful in terms of statistical significance.

TABLE 5

Survey Responses to Questions about Current and Future Service Levels

Comparison between large and small agencies

Current Service Levels	All		Large Agencies (Pop.)		Small Agencies (Pop.)		Large Agencies (VMT)		Small Agencies (VMT)	
	%	#	%	#	%	#	%	#	%	#
>100%	8%	6	4%	1	0%	0	0%	0	0%	0
90 - 100%	36%	26	44%	12	17%	2	75%	9	27%	3
75-90%	33%	24	33%	9	58%	7	25%	3	36%	4
50-75%	14%	10	11%	3	17%	2	0%	0	27%	3
25-50%	10%	7	7%	2	8%	1	0%	0	9%	1
Less than 25%	0%	0	0%	0	0%	0	0%	0	0%	0
0% (Not providing service)	0%	0	0%	0	0%	0	0%	0	0%	0
Not sure / Prefer not to answer	0%	0	0%	0	0%	0	0%	0	0%	0
Plans to Return to Full Service										
Not sure / Prefer not to answer	5%	4	7%	2	0%	0	8%	1	0%	0
Yes, we have plans to return to full service	48%	35	56%	15	67%	8	50%	6	64%	7
Yes, we already have returned to full service	37%	27	26%	7	33%	4	17%	2	36%	4
No plans to return to full service yet	10%	7	11%	3	0%	0	25%	3	0%	0

Source: Survey of American Public Transportation Association members.

Notes

- ¹ “Day-by-Day Ridership Numbers,” Metropolitan Transportation Authority, updated September 7, 2021, <https://new.mta.info/coronavirus/ridership>.
- ² AllTransit provides national data on the quality of service offered by transit agencies nationwide. “Discover the Social and Economic Benefits of Transit,” AllTransit, accessed August 15, 2021, <https://alltransit.cnt.org/>.
- ³ William H. Frey, “US Population Disperses to Suburbs, Exurbs, Rural Areas, and ‘Middle of the Country’ Metros,” *The Avenue* (blog), Brookings Institution, March 26, 2018, <https://www.brookings.edu/blog/the-avenue/2018/03/26/us-population-disperses-to-suburbs-exurbs-rural-areas-and-middle-of-the-country-metros/>.
- ⁴ Jed Kolko, “The Downtown Decade: US Population Density Rose in the 2010s,” *New York Times*, September 1, 2021, <https://www.nytimes.com/2021/09/01/upshot/the-downtown-decade-us-population-density-rose-in-the-2010s.html>.
- ⁵ See Karen Chapple and Tim Thomas, Urban Displacement Project,” accessed August 1, 2021 <https://www.urbandisplacement.org/>.
- ⁶ Yonah Freemark, “Why Telecommuting Really Matters, in 6 Charts,” Bloomberg CityLab, February 4, 2014, <https://www.bloomberg.com/news/articles/2014-02-04/why-telecommuting-really-matters-in-6-charts>.
- ⁷ “Introducing the Transit Equity Dashboard,” TransitCenter, June 17, 2021, <https://transitcenter.org/introducing-the-transit-equity-dashboard/>.
- ⁸ Monica Anderson, “Who Relies on Public Transit in the US,” Pew Research Center, April 7, 2016, <https://www.pewresearch.org/fact-tank/2016/04/07/who-relies-on-public-transit-in-the-u-s/>.
- ⁹ In some cases, however, commuter rail ridership grew because of the availability of ride-hailing services. See Babar and Burtch (2020).
- ¹⁰ Jed Kolko, Emily Badger, and Quoctrung Bui, “How the Pandemic Did, and Didn’t, Change Where Americans Move,” *New York Times*, April 19, 2021, <https://www.nytimes.com/interactive/2021/04/19/upshot/how-the-pandemic-did-and-didnt-change-moves.html>.
- ¹¹ According to the 2015–19 American Community Survey, the transit share of commuters in the regions with the highest transit use was 31.9 percent for New York, 17.6 percent for San Francisco, 13.4 percent for Boston, 13.4 percent for Washington, DC, and 12.1 percent for Chicago. Among regions with low transit use, the transit share of commuters was 4.9 percent for Los Angeles, 3.3 percent for Miami, 3 percent for Atlanta, and 1.4 percent for Dallas.
- ¹² D’Vera Cohn, “As the Pandemic Persisted, Financial Pressures Became a Bigger Factor in Why Americans Decided to Move,” Pew Research Center, February 4, 2021, <https://www.pewresearch.org/fact-tank/2021/02/04/as-the-pandemic-persisted-financial-pressures-became-a-bigger-factor-in-why-americans-decided-to-move/>.
- ¹³ Conor Dougherty, “Pandemic’s Toll on Housing: Falling Behind, Doubling Up,” *New York Times*, updated September 10, 2021, <https://www.nytimes.com/2021/02/06/business/economy/housing-insecurity.html>.
- ¹⁴ Changes in home value calculated using the Zillow Home Value Index. See “Housing Data,” Zillow, accessed September 12, 2021, <https://www.zillow.com/research/data/>. Increases in value between January 2019 and July 2021 were 4% in New York City, 6% in San Francisco, 9% in Boston, 11% in Washington, DC, 13% in Chicago, 53% in Austin, 48% in Phoenix, 44% in Detroit, 42% in Tucson, and 37% in Memphis.
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- ³¹ In Denver, 85.7% of neighborhoods had a higher than 10% decrease in service; 5.6% between 0 and 10% decrease; 1.2 % between 0 and 10% increase; and 7.5% higher than 10% increase. In Los Angeles, 92.1% of neighborhoods had a higher than 10% decrease in service; 6.6% between 0 and 10% decrease; 0.5% between 0 and 10% increase; and 0.9% higher than 10% increase. In Pittsburgh, 1.1% had a higher than 10% decrease in service; 61.8% between 0 and 10% decrease; 34.5% between 0 and 10% increase; and 2.6% higher than 10% increase. In Spokane, 15.6% had a higher than 10% decrease in service; 38.8% between 0 and 10% decrease; 35.9% between 0 and 10% increase; and 9.8% higher than 10% increase.

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