An aerial photograph of a town nestled in a valley. The town features a mix of brick and stone buildings, a prominent church with a steeple, and a winding road. A river flows through the valley, and the surrounding hills are covered in dense green forest. The sky is filled with soft, white clouds. A large yellow rectangular box is overlaid on the right side of the image, containing the title text.

# Public Transit Demand and Post-Pandemic Mobility Planning and Study to Address Economic Disparities in Rural Pennsylvania

**FINAL REPORT**

**Pennsylvania Transportation  
Advisory Committee**

October 2022

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# Executive Summary

This report identifies public transit demand factors and provides recommendations for post-pandemic mobility planning. The Pennsylvania Department of Transportation (PennDOT) and the State Transportation Advisory Committee (TAC) conducted mixed-method research of published and existing data, public surveys, and stakeholder interviews from 2021 to 2022. Each method of research resulted in a standalone document that included findings from each source and informed the next phase of data-gathering: a literature review (December 2021), a survey research summary (February 2022), and an interview research summary (April 2022).

Based on information gathered through available research, targeted public surveys, and stakeholder interviews, PennDOT and the TAC identified the major effects of the pandemic on rural transportation. More than two years have passed since the outbreak of COVID-19 was officially declared a pandemic, and the Commonwealth is actively learning to navigate the pandemic's long-term impacts. After conducting a thorough literature review, administering surveys, and interviewing stakeholders in various sectors within Pennsylvania, the following observations became evident:

- Rural areas of Pennsylvania were disproportionately affected by the COVID-19 pandemic.
- Transportation access for some transit-dependent individuals was disrupted or unreliable.
- Many new services, sectors, and policies emerged or grew in popularity during the pandemic due to factors such as quarantining, stay-at-home orders, and business or service closures.

One prominent long-term effect of the pandemic is the economic impact. Workforce practices like working hours, on-site requirements, and salaries are now in a phase of renegotiation. Constraints caused by the pandemic prompted transit agencies to modify these practices and obtain an improved understanding of core rider demographics and mobility needs. Innovations such as technology, high-speed internet, and smartphones streamlined and enhanced transit and other modes of travel. Still, these innovations also reinforced disparities in contexts where internet access is unaffordable, unreliable, or limited. Even with access to the internet, some individuals may lack the resources, such as smartphones and computers, to utilize internet access or the digital literacy required to take full advantage of the access to online transportation resources. Along with difficulties accessing reliable internet, technological resources, and digital literacy, rural areas struggled with post-pandemic limits to public transportation and local economies.

The transportation industry provides a lens through which to view these dynamic changes. Transportation is essential for workforce development; workers need to get from their places of residence to work and vice versa. Pandemic constraints and reliance on technology, along with the increased financial challenges the transportation industry has faced because of the pandemic, exacerbated the difficulties that some marginalized groups face as they seek mobility. Therefore, transit's resilience is dependent on prioritizing adaptability and ensuring that transit providers employ innovative tactics within their operations, while also addressing the needs of rural and disadvantaged riders.

Proactive adaptation is essential to address disparities, serve and retain existing riders, and encourage new ridership. Adaptability will remain a common theme, as the past two years suggest that there may be additional phases of the COVID-19 pandemic. The constraints of the pandemic will have a lasting impact on societal interactions, work habits, travel demand, and more. PennDOT and TAC have developed innovative recommendations for transit agencies to better serve rural Pennsylvanians by assessing public transit demand, post-pandemic mobility planning, transportation funding, and rural disparities:

Because it may take 5-8 years for transit demand to fully recover to its 2019 levels, attracting and retaining riders now should be a top priority.

Due to teleworking and the reduced need for office spaces, changing land-use patterns present an opportunity for Transit-Oriented Development.

Municipalities can continue to use shared streets to promote pedestrian activity, reduce reliance on personal vehicles, and make main streets more vibrant destinations.

Regional transportation providers (transit agencies, taxi companies, bikeshares, regional planning organizations, etc.) can partner to provide Mobility as a Service to connect travelers and commuters to multiple modes of transportation.

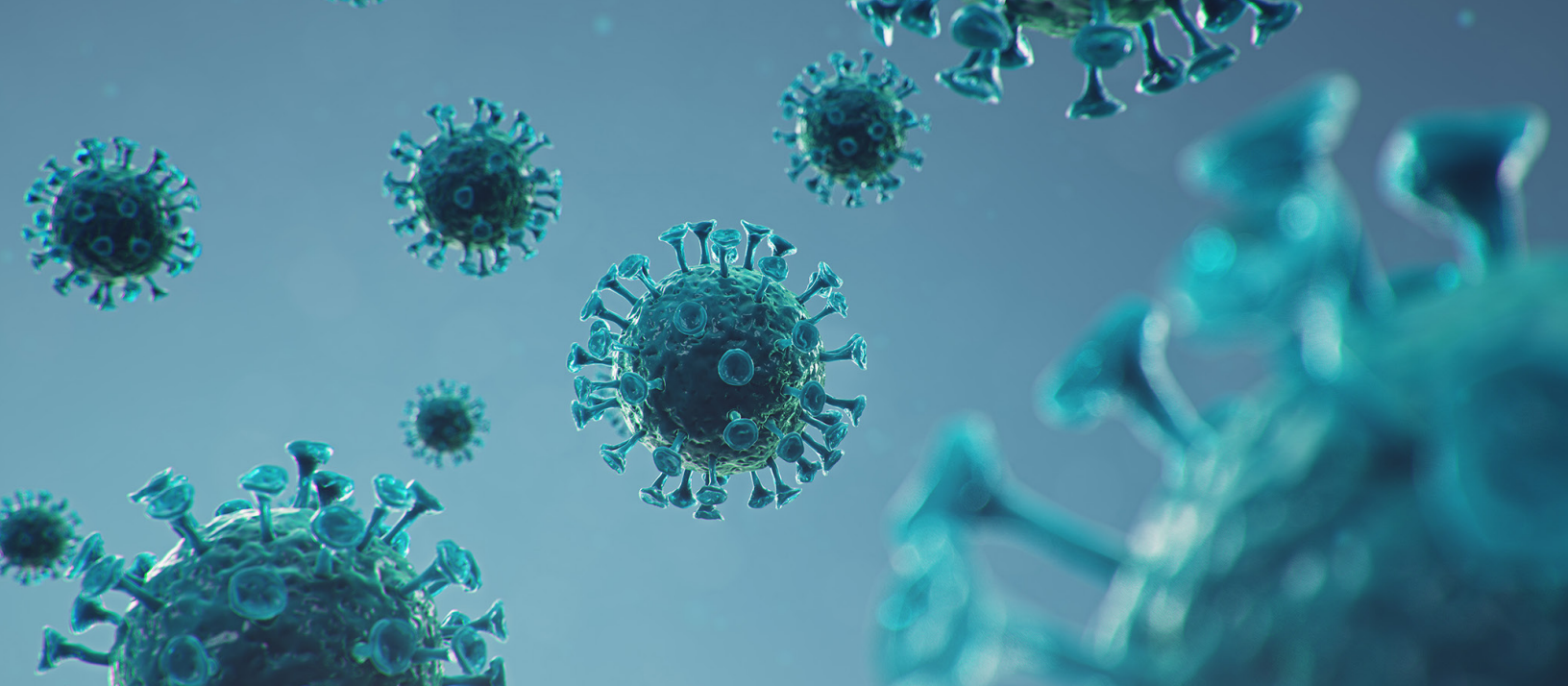
In some areas, microtransit may be able to reach a wider area than traditional fixed-route transit.

While ridership recovers, transit agencies will need to identify new funding methods to supplement decreasing fare revenues, such as Congestion Mitigation and Air Quality (CMAQ) funds and employer/transit agency partnerships.

At a time where internet access is increasingly necessary yet unattainable for many rural residents, transit agencies can drastically increase the value of their services to the community by installing WiFi hotspots on board buses and at transit hubs.

Since ridership numbers do not represent comprehensive success in rural transportation, agencies should consider average travel time, on-time performance, destination-specific access, and carbon emissions as key performance indicators.

The transit industry's recovery from the pandemic will present opportunities to deliver safer, more efficient, and more effective services. A comprehensive approach to the future role of public transit and transit agencies can help formulate a vision for post-pandemic mobility planning.



# Introduction

The World Health Organization (WHO) identified an outbreak of a new strain of coronavirus on January 7, 2020, causing the disease identified as Coronavirus Disease 2019 (COVID-19). Cases were quickly identified worldwide, and on January 21, 2020, the first confirmed COVID-19 case was identified in the United States. On March 6, 2020, Pennsylvania's Governor Tom Wolf reported the first case of COVID-19 in the Commonwealth. March 21, 2020, marked the beginning of a statewide shutdown for all "non-life-sustaining" businesses. These restrictions continued widely throughout March, April, and part of May. After a brief decline in cases over the summer of 2020, restrictions were re-established in the fall as the number of infections increased. Although multiple vaccines were developed and deployed to the majority of the American public, new variants of the virus led to renewed surges of COVID-19.

Over the course of 2020, travel restrictions, social distancing guidelines, and general societal change became part and parcel of the common American experience.

Considering these drastic alterations to lifestyles and health, resource consumption habits bound to the American economy changed substantially. During this first year of the pandemic, transit agencies across the United States experienced significant reductions in ridership and the associated fare revenue. The pandemic significantly impacted the transportation sector, and transit agencies experienced substantial decreases in ridership and associated fare revenue. According to the PennDOT Bureau of Public Transportation, Pennsylvania transit systems across the board (excluding the urban systems in Philadelphia and Pittsburgh) experienced a reduction of approximately 50% of their normal ridership in the third quarter of 2020.

The unknown impacts of lost revenue from typical transit funding mechanisms such as taxes and fees are potentially more devastating. By the end of 2020, the U.S. economy had shrunk by 3.5%. Revenues from sales taxes, motor fuel taxes, tolls, fees on Transportation Network Companies (TNCs), and the state-operated lottery had all declined. The majority of sources, comprising state and local sources of transit funding declined, and the future impacts of those reductions are difficult to conceptualize or quantify at the time of this report.

Transit is reliant on funds partly generated through rider fares to maintain transit infrastructure, pay salaries, and innovate when possible. Under this funding structure, rural agencies are much more vulnerable to unforeseen circumstances because their consumer base is significantly less than urban areas. There is less logistical flexibility during times of constraint when routes are longer and ridership is low, yet service must continue and employees must be compensated.

In response to the pandemic constraints, the Pennsylvania Department of Transportation (PennDOT) worked with the Federal Transit Administration (FTA) to obtain rural relief funding for all 17 rural fixed-route transit providers in Pennsylvania, defined as transit agencies serving areas with a population under 50,000. The relief funding was prioritized for operating expenses and direct mitigation expenses, such as the purchase of Personal Protective Equipment (PPE) and other supplies, and administrative leave (with both salaries and benefits) to avoid furloughs or layoffs, and replacement of lost revenue.

Prior to receiving federal relief funding, however, Pennsylvania's transit systems demonstrated astounding resilience. Since the beginning of the pandemic, the state considered public transportation an essential service and continued to operate and provide vital trips to work, medical appointments, shopping, etc. While most systems in the Commonwealth did reduce hours and operate modified service schedules during the pandemic, no system completely shut down. These efforts maintained essential services and ensured that the residents of Pennsylvania maintained a fundamental quality of life.

Despite the challenges of the pandemic, the demand for transit will continue, and the transit industry's recovery from the pandemic may present opportunities to deliver safer, more efficient, and more effective services than ever before. Affordable and accessible transportation provided by transit will be a mainstay of the foreseeable future, especially for essential workers and marginalized communities such as seniors, people with disabilities, and low-income individuals for whom vehicle ownership is not an option. Future transit plans should carefully consider changes in transit demand, funding, and economic disparities.

To identify public transit demand factors and develop recommendations for post-pandemic mobility planning, PennDOT and the State Transportation Advisory Committee conducted mixed-method research from 2021 to 2022. This mixed-method research entailed research of published and existing data, surveys, and stakeholder interviews.

Each phase of research resulted in a standalone document that covered the source's findings in depth and informed the next step of data-gathering:

- a literature review (December 2021)
- survey research summary (February 2022)
- interview research summary (April 2022)

This report analyzes the common implications from each data source and provides recommendations for effective mobility planning in a post-pandemic setting.

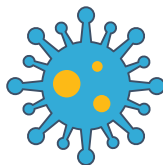


# Literature Review

## Lessons from Past Pandemics

A review of relevant literature related to the initial impacts of the COVID-19 pandemic as well as sources analyzing the impacts of other relevant historical events were conducted. This historical perspective will allow the Commonwealth and its agencies to anticipate the mid- to long-term impacts that lie ahead as the pandemic continues.

The research into past pandemics focused on outbreaks that paralleled the present pandemic in key respects. Each was significant and severe in the United States, occurred in the 20th or 21st centuries, spread among populations via an environmental transmission (airborne or waterborne), and noticeably affected travel patterns.



Research into past pandemics and epidemics yielded three case studies that could help inform COVID-19 recovery efforts:

1. the 1918 flu pandemic,
2. the 20th-century polio epidemic, and
3. the 2009 H1N1 “swine flu” pandemic.



## 1918 Flu

1918 - 1920  
25 Million US Cases  
650K US Deaths



## Polio

1900 - 1955  
552K US Cases  
57K US Deaths



## Swine Flu

2009 - 2010  
60.8 Million US Cases  
12.4K US Deaths



### 1918 “SPANISH FLU” PANDEMIC

In 1918, a virulent form of influenza caused a catastrophic pandemic at a time when wartime censorship kept North American and most European media from reporting on it. It was dubbed “Spanish flu” in the United States after Spanish newspapers first reported on the outbreak. The new strain of flu caused around 650,000 deaths in the U.S. (6.3 deaths per thousand).

After two years, the pandemic ran its course without vaccines or treatment because roughly one-third of the world’s population had contracted the virus and most countries gained herd immunity. The heavy toll that the two-year flu pandemic took on American society encouraged architects and urban planners to include more open spaces and indoor ventilation in their designs and led to less overcrowding in tenements. Economic recovery was largely driven by significant infrastructure investment, such as the Federal Highway Act of 1921, which led to highway construction that energized manufacturers (rubber, steel, and concrete) and service industries (hotels, gas stations, and restaurants).

### POLIO EPIDEMIC

Poliomyelitis is caused by a form of the poliovirus that spreads through contaminated drinking water; 1-2% of infections lead to temporary or permanent paralysis and sometimes death. For the first half of the 20th century, localized epidemics erupted in towns and cities across the U.S. during the summer months, including a severe nationwide outbreak in 1952. All told, around 57,000 people died in the U.S. in the first half of the 20th century, and tens of thousands who survived were paralyzed.

Spanish Flu 1918, San Francisco: People not wearing a mask would not be permitted to ride on the street cars.  
Source: Wikimedia



Local outbreaks like the Brooklyn outbreak of 1916 caused widespread panic: movie theaters and beaches were closed, and armed residents of neighboring communities forcibly turned New York City visitors away for fear of the outbreak spreading. There is still no cure for polio, but improved sanitation decreased its prevalence and a vaccine developed in the 1950s led to a highly successful vaccination campaign among nearly all children.

## H1N1 “SWINE FLU” PANDEMIC

In April 2009, a newly discovered strain of the H1N1 influenza virus passed from infected pigs to human populations in Mexico and the United States, causing flu-like symptoms. The H1N1 virus caused an estimated 12,500 deaths in the United States (0.04 deaths per thousand).

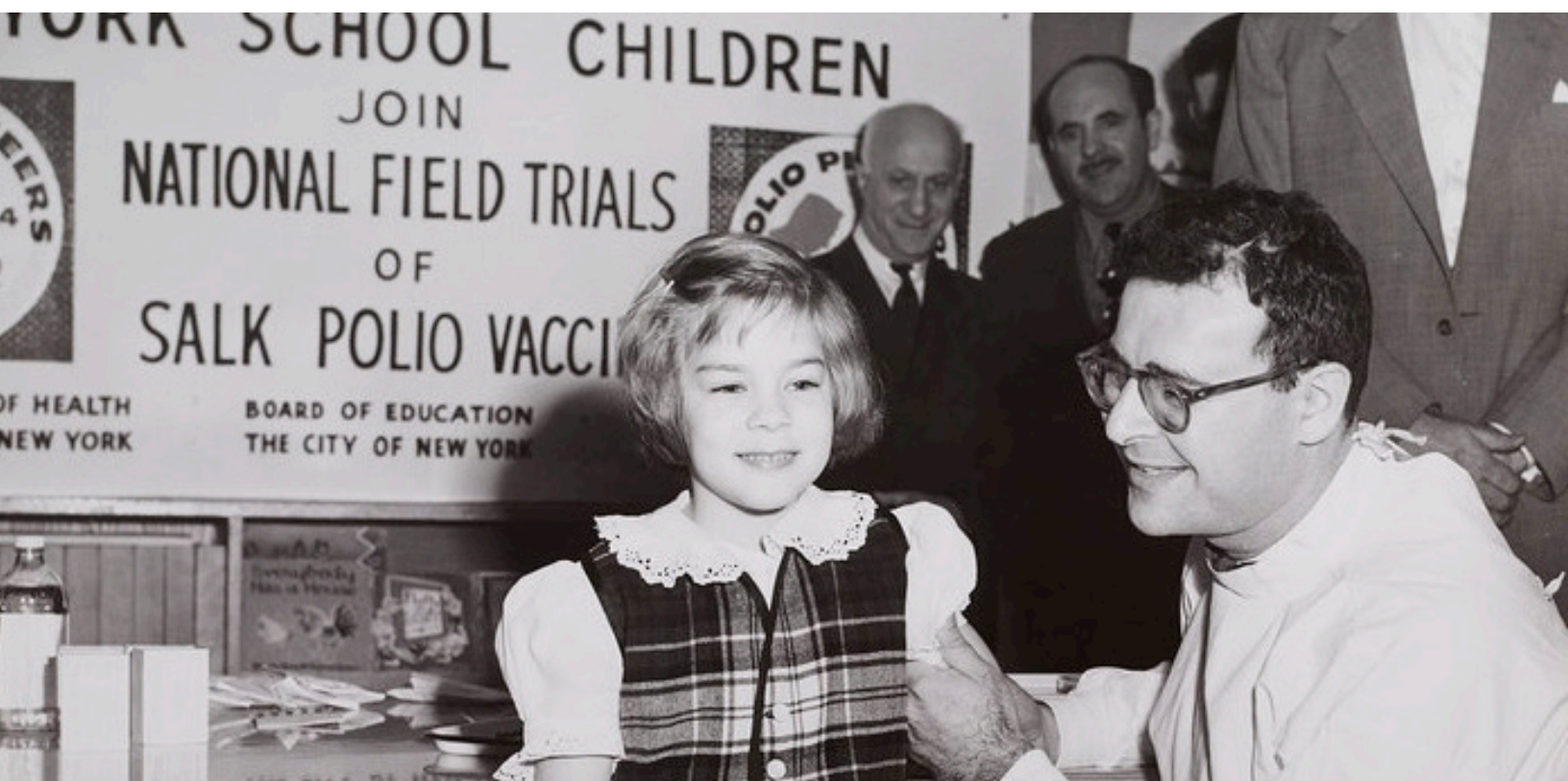
In October 2009, vaccines became available to inoculate against the 2009 pandemic H1N1 virus, and subsequent seasonal flu vaccines included the 2009 H1N1 vaccine. The CDC recommended preventative measures such as washing hands or using alcohol-based sanitizers, helping to normalize the regular use of alcohol-based hand sanitizers by the public.

The pandemic’s effects on travel and transportation were inconsistent across geographies and jurisdictions. The CDC issued recommendations for international travelers to vaccinate before travelling abroad and over 700 schools nationwide closed against localized outbreaks. However, the response to the pandemic varied among local, state, and national authorities.

Profiles of these three outbreaks identified two common trends:

- **Decreased Travel**  
During times of active outbreaks, many individuals may choose to avoid traveling to high-traffic areas (such as beaches or stadium events), specific locations of disease outbreak (either entire countries or individual localities), or high-density urban areas.
- **Changing Expectations for Cleanliness**  
For airborne diseases that spread easily within communities, the perception of cleanliness becomes an important fixation for an anxious public. This tends to heighten expectations for hygienic public spaces and to normalize personal precautions such as wearing masks and sanitizing hands.

Girl gets injection as part of National Foundation for Infantile Paralysis vaccine testing, undated. Department of Health Collection, NYC Municipal Archives.





## Economic Impacts

According to the National Bureau of Economic Research (NBER) Business Cycle Date Committee, the COVID-19 pandemic caused a recession of only two months during the second quarter of 2020, making it the shortest recession in the nation's history. However, the official end of the recession does not mean that the economy has returned to the operating level of February 2020—the economy has begun recovering from the pandemic. However, economic shockwaves are still being felt in the national economy and workforce.

### FINANCIAL RECOVERY

The capital is available for economic recovery, with global investors and cash stockpiles serving as positive signs. Demand for stocks and increased household savings is fueling investor confidence and several large companies have announced facility expansions, expanding research budgets, paying down debt, or seeking acquisitions. U.S. GDP rebounded from a 2.2% decrease in 2020 to a 10.1% increase in 2021, and the first quarter of 2022 was on track for additional increases in GDP. This demonstrates the resiliency of the U.S. economic system.

Three rounds of federal pandemic relief, in 2020 and early 2021, have helped support rural transit agencies in the face of economic upheaval. Increased federal infrastructure investments may help transit agencies innovate and adapt to post-pandemic conditions.

Transit agencies must continue to show elected officials, opinion leaders, and the public how they are using these historic funding levels to create more innovative, equitable, efficient, reliable, sustainable, and future-oriented transit. Investments in public transportation are investments in equity as transit improves access to work and life's daily necessities in disadvantaged communities, providing reliable options and increased mobility for seniors, persons with disabilities, and those without other alternatives.

Enacted in March 2020, the Coronavirus Aid, Relief, and Economic Security (CARES) Act allocated **\$1.1 billion** to urban and rural transit in Pennsylvania with no local match requirements, in addition to allowing funding to be directed toward capital and operating expenses. The Coronavirus Response and Relief Supplemental Appropriations Act (CRRSAA) of December 2020 provided **\$440 million** to transit in Pennsylvania with no local match requirements.

A total of **\$50 million** nationwide was also allocated towards the Enhanced Mobility of Seniors and Individuals with Disabilities Program. With the American Rescue Plan (ARP) of March 2021, the FTA made an estimated **\$1 billion** available to transit operations in the state through Urbanized Formula funds and Rural Area Formula funds to cover eligible transit operating costs related to COVID-19 transmission mitigation and maintaining operations.

Further federal funding for transit was announced with the passage of the Infrastructure Investment and Jobs Act (IIJA) of November 2021, which increases formula funding by **\$2.8 billion** over five years to improve public transportation options in Pennsylvania. The IIJA also allows states and transit agencies to compete for **\$23 billion** in grant funding for capital investment and other transportation projects.

## WORKFORCE RECOVERY

In the second quarter of 2020, millions of workers across the country were laid off, while others retired early to alleviate the stress and uncertainty of working on the front lines. For older workers and retirees working a second career, the hazards of the pandemic and their increased susceptibility to COVID-19 prompted them to exit the job market entirely. These events have led to a significant labor shortage in many job sectors, especially in transportation, health care, and hospitality.

After decades of wage stagnation, this upheaval in the workforce has increased demands for a livable minimum wage. Even when many workers returned to the job market after being laid off, many chose to strategically re-enter the workforce in positions with higher salaries and a lower risk of layoffs.

Although the transportation sector has been one of the hardest hit by the pandemic, it is also a crucial component of workforce recovery. Transportation is essential for workforce development, as workers need to get from their place of residence to work and vice versa. In the 2020 Annual Report of Pennsylvania's Keystone Economic Development and Workforce Command Center, transportation ranked the highest among five critical barriers to employment for jobseekers, workers, and employers. The report highlighted insufficient public transit options as a challenge to workforce transportation. The Command Center recommended four approaches that both public and private sector entities should pursue to address this challenge:

<b>Focus on Transit-Oriented Development (public sector)</b>	<b>Advance Targeted Economic Development (public and private sectors)</b>	<b>Implement Employee Transportation Programs (private sector)</b>
Commonwealth agencies should prioritize investments that promote housing and business development near transit facilities.	Employers should evaluate employer-employee cost-sharing programs; partner with regional transit agencies to implement fixed-route service to transport employees from higher unemployment areas to jobs; and provide last-mile transportation options for employees.	Public transit should be a consideration for business attraction and retention. Zoning and land use policies should also focus on the redevelopment of underutilized sites with the needed infrastructure and proximity to the workforce.
<b>Increase Awareness of Transit Subsidies (public sector)</b>		
The Commonwealth should support disadvantaged commuters by increasing awareness of reduced-fare programs and expanding the number of individuals qualifying for programs. These programs for people with disabilities and those over the age of 65 improve individuals' quality of life and increase participation in their communities. Increasing the inclusivity of reduced fare programs and educating consumers about reduced fare opportunities would help revitalize communities and support workforce recovery.		



# Evolving Transit Demand

During the first year of the pandemic, the percentage of employees working from home increased dramatically across all education levels—19% of workers whose highest level of education was a high school diploma worked from home in 2020 (up from 13% in 2019), and 65% of workers with a bachelor’s degree or higher worked from home that year (up from 37% in 2019). Those rates may deflate slightly as more employers return to in-person operations, but the pandemic has proven that remote work is efficient and popular with many workers.

After experiencing the benefits of remote work, many employees may prefer to work fewer days in the office in the long term. In fact, a survey conducted in mid-2021 found that as much as 40% of Americans who worked from home during the pandemic would look for other employment if required to return to the office full-time.

If some pre-pandemic commuters transition to working remotely even a few days a week and only come into the office when needed, these workers have a reduced transportation need. In response, some businesses such as restaurants and cleaners that support office workers have scaled back operations to compensate for decreased weekday business, affecting workers’ hours at these businesses. As a result, demand for public transportation during rush hour would remain flat or even decrease. This presents an opportunity for transit agencies to reallocate transit funding to operate higher levels of all-day and weekend service.

Other factors reducing the need for transportation include an increased reliance on direct-to-consumer retail delivery and the increased popularity of telemedicine. These factors may have a marginal impact on transit trips for shopping and medical services.

With dramatic reductions in ridership, transit agencies have a narrow window to retain and increase ridership post-pandemic while workers are in the process of evaluating their travel habits or making changes to their careers. Many transit agencies and community organizations were already beginning to implement policies to attract and retain riders before the pandemic, with practices such as cashless fare options, travel training for first-time riders, and emergency car rides for regular riders. For example, the Commuter Services of Pennsylvania program (operated by a non-profit with ties to regional transit agencies, MPOs, and chambers of commerce) has served riders in south-central Pennsylvania for over a decade. The program offers incentives for transit use and emergency rides home within a nine-county area.



# Addressing Disparities

Accessible, affordable transportation is critical to an acceptable quality of life, yet certain demographic groups have less access to opportunities due to a lack of transportation. As of 2019, 11% of households in Pennsylvania lacked access to vehicles compared to a nationwide average of 9%. Many of these transit-dependent households are lower income and tend to be comprised of people of color. In the same 2019 demographic analysis, racial minority households in Pennsylvania were three times more likely to lack access to a personal vehicle. Black households in particular were most likely not to own a vehicle.

As a result of the pandemic, changes to transportation options across the country affected who could access transit and therefore services and employment opportunities. Transportation Network Companies (TNCs) and taxi companies were hit hard by pandemic-related lockdowns that caused a dramatic reduction in demand and, consequently, service; this reduction in service was particularly acute in rural areas, where TNC service was already minimal. Another transportation constraint during this time was the drastically reduced supply of new and used vehicles available on the market, which made buying a vehicle prohibitively expensive for many individuals. Diminishing access to both TNC service and car ownership is a significant challenge in rural communities where the majority of residents rely on personal vehicles.

To complicate the transportation landscape, after the initial crisis of the pandemic lockdown gave way to a “new normal,” many transit agencies needed to adjust their services and operations due to staffing constraints or lower ridership. Reduction in transportation options disproportionately affected certain population groups:

## Essential Workers

disproportionately people of color, immigrants, and low-income;  
must travel to work in person

## Low-Income

more likely to lack vehicle access, transportation options, and  
potentially childcare

## Seniors

may be isolated at home due to lack of vehicle access or a driver's  
license, reduced transit services, the closing of essential locations,  
or technological barriers to learning about service changes

Service disparities and service recovery can be addressed in various ways through changes in transportation policies. Although strategies will vary by agency and even by location within a service area, there are some general strategies to close gaps:



Expanding service to accommodate early  
or late shifts and weekend employment



Keeping transit affordable by eliminating transfer  
fees and creating flat-fare zones



Realigning services  
with people's travel needs



Coordinating land use  
and transit investments

# Resilient Transit

The COVID-19 pandemic may have permanently changed commuting patterns, creating long-term implications for public transit. Transportation leaders and designers have suggested the following steps to increase transit's resiliency in the future, regardless of the magnitude of changes that the pandemic or other world events cause in the longer term.



## Focus on Core Ridership

Core ridership refers to people without car access who rely on transit and essential workers who travel during off-peak hours. The focus should be on areas where people did not stop or lessen transit usage during the pandemic.



## Detangle Jurisdictions

The multiple agencies, private organizations, and jurisdictions that have authority over roadways, sidewalks, and transportation operations add time and cost to transit operations. Much of this entanglement is tied to complex funding flows, detracting from efficiency. Overlapping transportation providers can fuel further inefficiencies and confuse the public about what transportation options are available and when. Services that end abruptly at a municipal boundary or county line may not reflect the reality of which important destinations riders need access to in their communities.



## Reduce Policy Incentives for Private Car Traffic

Public policies frequently undermine transit providers by prioritizing parking for personal vehicles, disincentivizing transit use, and dedicating large amounts of public space to private car traffic. Municipal requirements for on- or off-street parking in commercial or residential areas (such as two parking spots per apartment unit, or one parking space for every 200 sq. ft. of commercial space) disincentivize the use of transit, walking, or biking to patronize downtown businesses and amenities. These requirements inevitably encourage parking surpluses that prioritize personal vehicle use at the expense of mixed-use spaces that could instead encourage transit and non-motorized transportation.



## Re-Envision Data Collection and Performance Indicators

Transit systems need accurate data to support proposed projects and initiatives to achieve agency goals, but performance indicators that focus solely on ridership do not provide an accurate picture of the success of a transit system from a community perspective. Instead of increasing ridership as a measure of a healthy transit system, transit travel times compared to driving a personal vehicle may be a more relevant performance indicator. Likewise, route-mapping software can help visualize where riders can travel to from a given starting point in under an hour, indicating how effectively a system can provide access to various essential services. Carbon emissions could become part of how projects are evaluated and maintaining data about a transit system's emissions would support future grant applications where such information will be evaluated.



# Survey Research

To gain insight on Pennsylvanians' views on transit, three surveys were created for distribution to the following groups: the General Public, Representatives of Pennsylvania Municipal Planning Organizations (MPOs) and Regional Planning Organizations (RPOs), and Transportation Providers. The surveys collectively received 1,510 responses, broken down as follows:

1. General Public (1,445 participants)
2. Representatives of Pennsylvania MPOs and RPOs (41 participants)
3. Transportation Providers (24 participants)

Following the survey for the public, an analysis of gender, race, modes of transportation use, and purposes for transportation was utilized to create a detailed profile of survey participants.

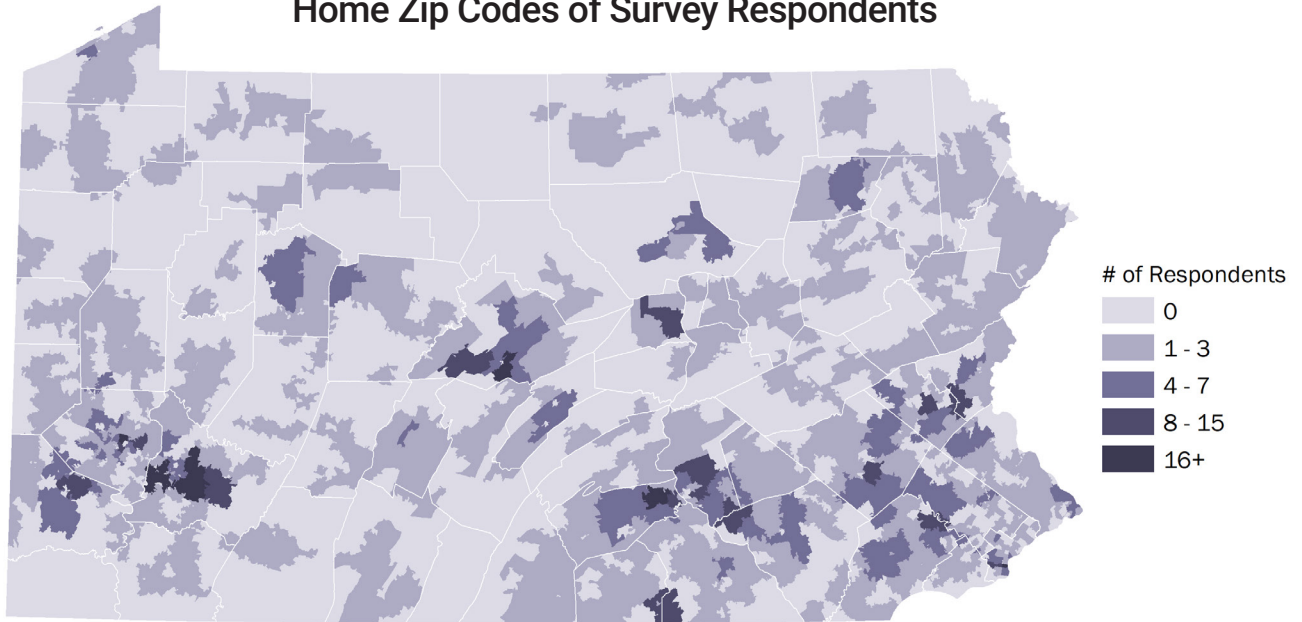
In total...



across Pennsylvania were represented in the findings.

According to survey responses, 47% of the public participants consider their place of residence to be a suburban location, with 24% indicating urban, and 29% signifying rural. It should be noted, however, that more than 65% of respondents who self-identified as rural residents in fact resided in areas defined by the US Census Bureau as “urban” and high-density. Overall, this speaks to a strong tendency for residents across Pennsylvania to identify more closely with rural landscapes despite the numerical population density.

## Home Zip Codes of Survey Respondents



## Impacts on Travel Origins and Destinations

Survey respondents reported a moderate but waning impact of the pandemic on their current living situations—nearly 20% of the respondents who moved between 2019 and 2021 cited the pandemic as a driving factor behind their move. Of respondents who intend to relocate soon, only 5% listed COVID-19 as a significant influence in their decision.

Figure 1: If your zip code has changed since 2019, was your relocation influenced by the COVID-19 pandemic?

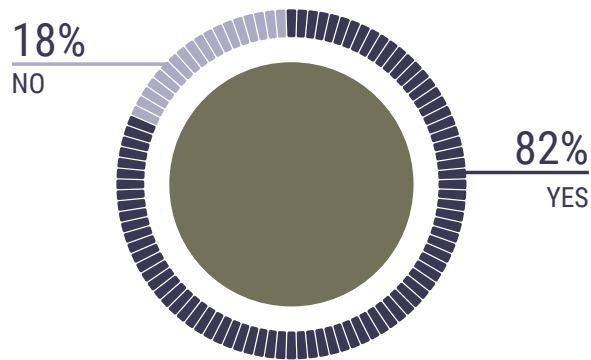
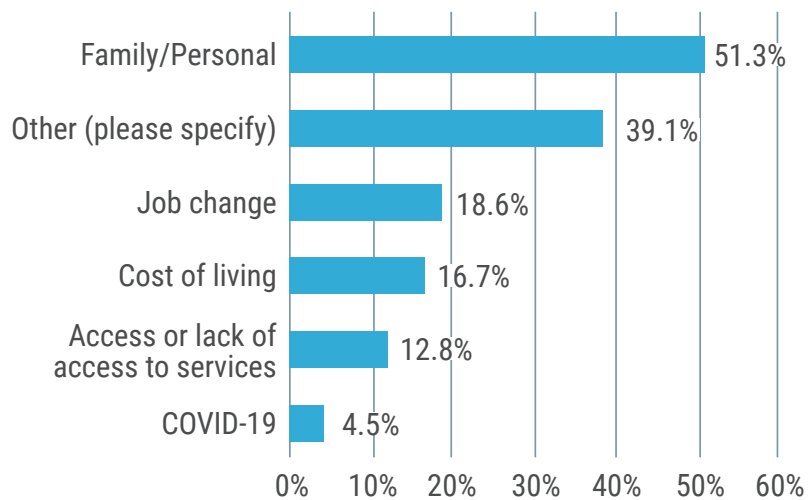


Figure 2: If you are planning to relocate in the next 1-2 years, what has influenced your decision? (Select all that apply)





While the pandemic has led to a change of residence for only a modest proportion of respondents, it has greatly influenced employment destinations. Fifteen percent of respondents reported changing either their job or school, and of those nearly 45% pointed to the COVID-19 pandemic as the cause. The pandemic has also led to an overall decrease in travel and commuting, with nearly two-thirds of respondents reporting that they do not spend as much time travelling as they did before the pandemic.

Figure 3: If the location of your work/school changed since 2019, was the change influenced by the COVID-19 pandemic?

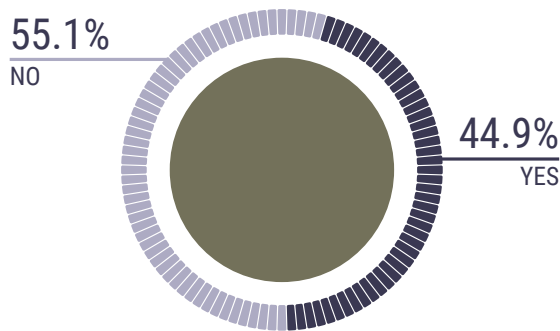
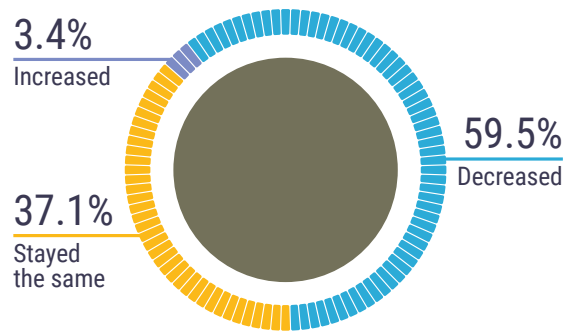
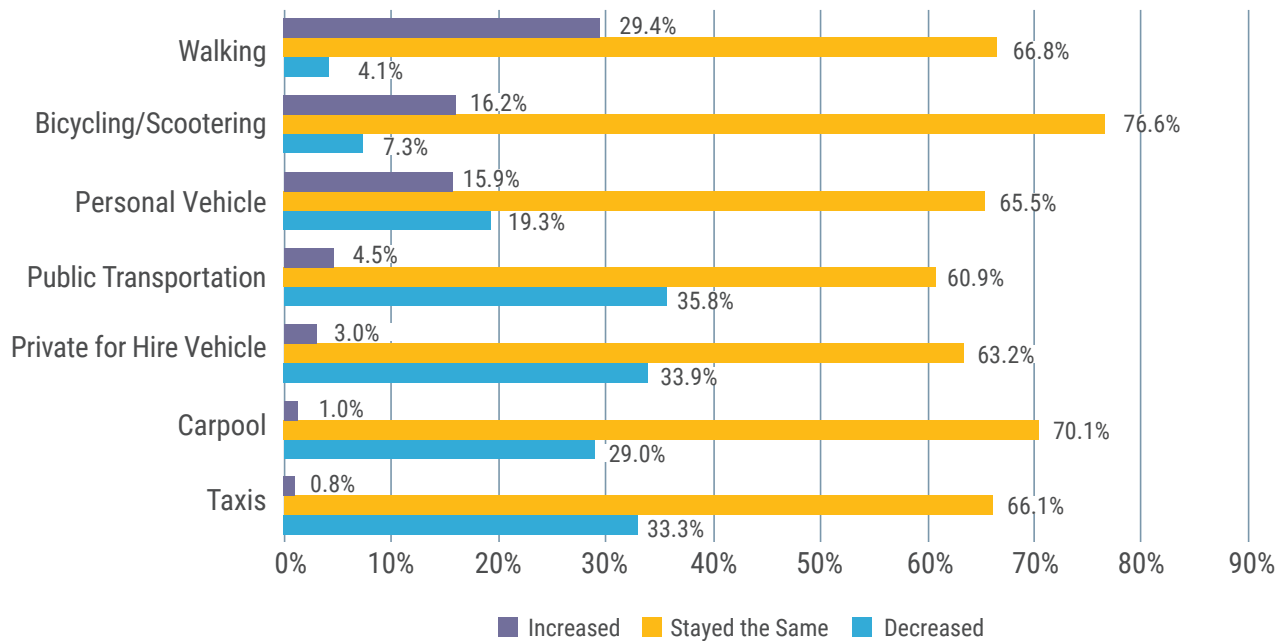


Figure 4: Has your routine travel and/or commute increased, decreased, or stayed the same since the COVID-19 pandemic began?



## Transportation Preferences

Independent modes of transportation—such as walking, biking, or using a personal vehicle—gained favor during the pandemic, whereas shared modes—such as transit, carpools, and taxis—decreased in popularity. Open-ended comments revealed a tension between respondents who are still apprehensive about using transit due to health and safety concerns, and respondents who feel that too much emphasis has been placed on the pandemic, creating an undue sense of fear and worry.



In open-ended comments, respondents indicated an interest in alternative transit modes (bicycling and rail) and a need for structural improvements to accommodate those modes. Several comments highlighted the need for developing passenger rail access and connections throughout Pennsylvania, as well as increasing well-planned bicycle infrastructure to provide more options to travel to work.



# Interviews

Telephone and online interviews were conducted with real estate professionals, state agencies and associations, businesses, and a small group of transit-dependent individuals for the purpose of understanding their experiences during the pandemic and understanding what their plans will be post-pandemic.



Interviews provided insights into

## future transit demand and unique mobility challenges

and will be used along with research survey data to develop study recommendations.

Interview questions were customized for each organization or individual interviewed, and interviews ranged between 15 minutes to one hour. Representatives from the City Center District of Philadelphia, New Castle Area Transit Authority, SEPTA (Southeastern PA Transportation Authority), and Warren County Transit Authority were not interviewed, but provided data and resources that supplemented the information collected during interviews.

Organizations/individuals providing input for this task included:

- Center for Rural Pennsylvania
- Center City District
- Commute with Enterprise
- Targeted Pet Treats
- NAIOP (National Association of Industrial Parks) Pittsburgh
- New Castle Area Transit Authority
- New Castle Area Transit Authority - select riders
- Northern Pennsylvania Regional College
- Pennsylvania Association of Realtors
- Pennsylvania Department of General Services
- Pennsylvania Downtown Center
- Pennsylvania Farm Bureau
- Pennsylvania Rural Electric Association
- rabbittransit
- Realtors Association of York and Adams Counties
- SEPTA
- Warren County Transit Authority



## Insight from Rural Communities

The rapid increase in confirmed COVID-19 cases across the U.S. resulted in growing community concerns. In line with safety precautions, the U.S. government, in an effort to limit the spread of COVID-19, implemented unprecedented measures restricting travel, movement, and activity participation in many cities across the nation. A variety of stringent policies, including a stay-at-home policy; closures for schools, public institutions, and workplaces; cancellation of mass events and public gatherings; and restrictions on public transport, affected approximately more than three-quarters of the U.S. population, contributing to a general reduction in mobility on an unprecedented scale.

Affordable, frequent public and private transportation, which was already an accessibility challenge in rural communities, saw a steep decline. As the pandemic progressed, rural communities began to bear a greater burden from virus safety precautions. Several ongoing challenges faced by rural Pennsylvania communities were exacerbated. Driven by the remote location of many rural communities, both public and private transportation were impacted even more during the pandemic.

The following is a list of reported factors that will impact rural transportation providers as they seek to return to pre-pandemic levels of service:

### **Housing Shifts Due to the COVID-19 Pandemic**

In a 2021 study done by the Center for Rural PA for five counties (Monroe, Pike, Wayne, Susquehanna, and Somerset), it was found that there was an increase in rural home sales during the pandemic. Many of these new homebuyers relocated to these counties from other counties that had higher rates of COVID-19, including urban centers. However, reduced services brought on by the pandemic have made it difficult for the transportation systems in these rural areas to accommodate the increased population.

### **Downtown Businesses**

Interviewees generally reported many business closures in rural downtowns. Small business revenues declined sharply, down nearly 30% compared to pre-pandemic figures, as potential shoppers continue to be wary of in-person exposure. Online shopping is at an all-time high, and consumers have become more familiar with buy-online-pick-up-in-store, app-based ordering systems, and contactless payment. Even for businesses that have remained open and viable, two years of restricted revenue has severely hampered the ability of small businesses to thrive.

### **Teleworking**

The COVID-19 pandemic also changed labor dynamics when it came to working location, with a majority of American's shifting to online work. However, the prevalence of home-based work was not equitable across all demographic groups, with high-income, highly educated, and urban individuals being most likely to work from home due to the suitability of their occupations for telework. The pandemic highlighted the lack of efficient, affordable broadband access in rural areas.

### **Rising Gas Prices**

Increased national inflation and recent geopolitical conflicts have driven up the cost of gasoline. Community leaders noted that increasing gas prices lead to added economic challenges for rural Pennsylvanians who need to travel long distances for each trip. While the challenges associated with the pandemic continue to be realized and addressed, the added pressure of rising gasoline prices will only add to transportation concerns in rural Pennsylvania.

### **Cleaner Fuels**

Reducing transit vehicles' reliance on diesel by increasing the proportion of fleets using alternative fuels will improve air quality in local communities and make transit operations more flexible as gas and diesel prices fluctuate. Electric vehicles (EVs) represent a shift in the transportation sector away from a reliance on fossil fuels. However, electric buses are currently not feasible for all transit agencies due to the high cost of EVs and the long wait times to order electric buses from manufacturers. Until electric buses become a viable option for all transit providers, the Pennsylvania Department of Transportation's has invested in Compressed Natural Gas (CNG) to provide a cleaner fuel than diesel.

### **Passenger Train Access**

Citizens in rural Pennsylvania are in favor of passenger train access from rural Pennsylvania communities to larger metropolitan areas.

### **Disparity**

Gaps in transportation access burden some members of the community more than other, but not every locality can improve rural transportation disparities on its own.

# Insights from Real Estate Professionals

State and regional real estate professionals and brokers representing the commercial (office, industrial, retail) and residential markets were interviewed. Interviews focused on future, pandemic-related real estate changes, during which stakeholders identified potential land use and real estate space trends, anticipated changes post-pandemic, and discussed the impacts to transportation.

## OFFICE TRENDS

The shift in office workers conducting work from home has impacted public transportation in and around Philadelphia, Pittsburgh, and Harrisburg. Pre-pandemic, commuter buses were focused on taking workers to downtown Philadelphia, Pittsburgh, and Harrisburg. Post-pandemic, public transportation will likely need to focus on travelling 'out' of Downtown to multiple office and residential hubs. This shift could take place as the location of office workspaces disperses.

## INDUSTRIAL/WAREHOUSE

The nation's industrial warehouse market continues to be very strong due to the growth in e-commerce, accelerated by the pandemic. However, the current national supply chain is susceptible to large-scale economic shocks.

The ability to recover quickly from an unexpected shock is required for a resilient system. Other firms should adopt the manufacturing supply chain's three inter-related strategies to strengthen resiliency:

1. **Visibility:** The capability to monitor the supply chain, often in real time.
2. **Buffer:** Having multiple sources of supply or holding more inventory.
3. **Agility:** The ability to pivot quickly to alternative processes or products.

## RETAIL

The leisure, hospitality, and restaurant sectors were hard-hit by the shift to remote office work, impacting downtown retail operations, decreasing tax revenues, and eliminating jobs. Post-pandemic retailers are being creative with their spaces, making them destination-oriented and marketing them to citizens with disposable income and to employers who want venues for employee gatherings.

## RESIDENTIAL

Interviews revealed a common trend across the state of increased home prices and high demand, but a continual lack of housing inventory. Over the course of the pandemic, home buyers' preferences grew more selective, with homebuyers expressing a desire for more square footage per unit.



# Insights from Employers

After being home for an extended period of time, the slow return to work for some service workers has hindered business growth and, in some cases, caused business closures. Several other issues that rural communities must face include:

## WORKFORCE AVAILABILITY

Workforce availability is an ongoing challenge throughout Pennsylvania, with transportation to/from work being one of the main constraints.

## SHIFTING BUSINESS NEEDS

It is expected that post-pandemic work hubs will be dispersed between urban, suburban, and rural locations. A shift to telework is also adjusting the amount of office space needed for businesses.

## LIMITED TRANSIT OPTIONS

As previously noted, workers in rural Pennsylvania generally travel greater distances to work than non-rural areas. Over three-quarters of all jobs in the 100 largest metropolitan areas are in neighborhoods with transit service. Western metro areas like Los Angeles and Seattle exhibit the highest coverage rates, while rates are lowest in Southern metro areas like Atlanta and Greenville. Regardless of region, city jobs across every metro area and industry category have better access to transit than their rural counterparts. Rural areas' large workforce regions generally mean that job seekers travel long distances to access services and jobs (with limited public transit options) and that programs, employers, and training providers, are not in close proximity to one another. The suburbanization of jobs obstructs transit's ability to connect workers to opportunities and employment to local labor pools.



# Insights from Transit Agencies

While transit agencies were not the focus of interviews per the project scope, an interview was held with rabbitransit to understand some of the transportation trends identified during other interviews. rabbitransit serves the transportation needs of several central and southcentral Pennsylvania counties. In addition, SEPTA ridership information was obtained through a report provided by Center City District.

Transit comments were also obtained from a private-for-hire rideshare company serving employee transportation needs throughout Pennsylvania and from a small group of transit-dependent individuals from western Pennsylvania.

Overall, SETPA's ridership levels have been significantly impacted by the COVID-19 pandemic with overall ridership at 40% of pre-pandemic levels (January 2022). SEPTA's weekly ridership in February 2020 was nearly 6 million. By April 2020, weekly ridership decreased to less than 1 million. Weekly ridership levels rebounded to over 3 million in October 2021. Due to the Omicron variant surge, weekly ridership levels fell again and by January 2022 were 2.2 million.

In comparison, rabbitransit ridership levels have been steadily recovering, approaching pre-pandemic levels. As of March 2022, shared ride services reached approximately 75% of pre-pandemic ridership levels and fixed-route ridership returned to 60%.

# Insights from Private Vanshare Providers

During the pandemic, vanshare providers like Commute with Enterprise experienced a marked decrease in white-collar, office-destination van pools. With this decrease, vanpools for shift workers were identified as a new, more profitable market.

Today, vanpool participants are increasingly essential workers, low-income workers, and workers from single-car families who work the second and third shifts not typically served by public transportation.

The current geographic concentration of Commute with Enterprise van pools in Pennsylvania includes Philadelphia, Pittsburgh, Franklin County (Letterkenny Army Depot), and Monroe County (Tobyhanna Army Depot).

Federal employee transit benefits of up to \$280 per month help offset vanpool costs.

## Insights from Transit-Dependent Individuals

Telephone calls were conducted with a few transit-dependent individuals from western Pennsylvania. Contact information was provided by the area transit agency. Transit-dependent individuals interviewed had no vehicle and relied on public transportation. These individuals were consistently satisfied and complimentary of the public transportation provided in their area.

**Minimal Service Disruptions:** The pandemic had minimal impact on the provision of public transportation services. One rider said although they anticipated disruptions and impact, it did not happen. .

**Cleanliness/Safety:** Buses were kept clean from the start of the pandemic to the present. Riders did not enjoy wearing masks but did not mind wearing masks for safety.

**Social Distancing:** Additional routes were added to improve social distancing on buses. This not only increased personal passenger space but provided extra convenience with more times available to board a bus.

**Affordable Fares:** Transit-dependent individuals reported that on the whole they found fares to be affordably priced. Seniors and persons with disabilities in particular benefit from special fare discounts subsidized by the state and federal government.

**Routes/Schedules:** Additional routes were added to improve social distancing and riders hope the additional routes will continue in the future. Routes take riders to a variety of places such as grocery stores, larger retailers (Walmart), etc. These routes tend to be crowded on certain days. Combining some routes has led to longer travel times. Separating routes that were combined during the pandemic would be helpful.

**Longer Operating Hours:** Riders said longer operating hours in the evening and on Saturday would be helpful, but they are currently satisfied with the service provided.

**Employer Transit Incentives:** Transit-dependent individuals who worked reported no employer transit subsidy; however, their place of employment was relatively close to home.

**Back to Normal:** Transit riders said public transportation is back to normal. Riders are grateful for bus drivers, and a few expressed that driver pay should be increased.

Across these interviews, participants continually stressed that while the pandemic is slowing down, it is not over, and rural Pennsylvania communities are still overly susceptible due to limited access to healthcare as compared to non-rural communities.



# Implications

Over two years have passed since the outbreak of COVID-19 was officially declared a pandemic, and the Commonwealth and nation are still rebounding from the ongoing uncertainty about the long-term impacts that it has caused. After conducting a thorough literature review, administering surveys, and interviewing various sectors within Pennsylvania, the following observations became evident:

Rural areas of Pennsylvania were disproportionately affected by the COVID-19 pandemic.

Some modes of transportation were disrupted or unreliable, especially for travelers reliant on TNCs or aviation.

Many new services, sectors, and policies emerged or grew in popularity during the pandemic due to factors such as quarantining, stay-at-home orders, and business or service closures



## RURAL CHALLENGES

The COVID-19 pandemic has intensified ongoing issues in rural Pennsylvania, such as access to high-speed broadband connections, affordable transportation options, and health care options. With 48 of the state's counties considered rural, 72% of the state was disproportionately affected by these issues.

### Broadband Access

In 2019, it was estimated that over 800,000 residents in the Commonwealth lacked access to a broadband connection. Many urban and suburban areas of the state have widespread broadband or other high-speed connections; however, the more rural areas lack the same amount and strength of coverage. Many services have relied on virtual applications and communication to continue operating "business as usual" throughout the pandemic. These online adaptations include telemedicine, grocery delivery, e-commerce, school, and telework. Lack of access to reliable broadband puts people at a disadvantage when they are unable to benefit from the convenience of these services, especially if coupled with limited access to transportation and the ability to leave the house.

### Lack of Affordable Transportation Options

While it may seem intuitive to simply move closer to places of employment as a solution for better transportation access in rural Pennsylvania, this is not always feasible. Higher-priced housing tends to surround public transit in centralized locations, pushing lower-income populations further outward to neighborhoods with less public transit access. This has been especially prevalent during the pandemic due to increasing housing costs. There is also less access to microtransit and transportation network companies such as Uber and Lyft as they rarely operate in rural Pennsylvania due to low population density. In addition, taxi service is spread intermittently.



## THE “NEW NORMAL”

People have had to alter their lives and adapt in many ways over the past two years due to many factors such as quarantining, Stay-at-Home policies, and institutions and places of business having to shut down. Overall, this has affected demand factors for transportation, commerce, and real estate (land use).



### Mobility as a Service (MaaS)

According to Pew Research Center, approximately 97% of Americans own a cellphone, with about 85% owning a smartphone. Access to smartphones, cellular data, and WiFi is attributed to the success of mobility as a service (MaaS) as it allows for convenient multimodal trip planning and contactless payments. Through a combination of public transit working with private transportation companies, MaaS can improve transportation access for many, as well as reduce traffic congestion. However, what can be convenient for some can pose as a barrier for unbanked individuals, those who do not own a smart phone, do not have cellular data, or have reliable access to WiFi.



### Increased E-commerce

E-commerce continues to grow in popularity, impacting industrial real estate as land use patterns continue to change in communities that host warehouse distribution facilities. Online shopping was already on the rise, having grown from 10% of the retail market in 2017 to 16% just before the COVID-19 pandemic occurring in the U.S. In April 2020, it nearly doubled and, in June, was still about 57% higher. The decline of shopping malls, especially those closing due to the pandemic, will also likely have an influence any further increases. This will potentially increase the amount of delivery trucks on the road, which could also influence changes in street networks.



### Teleworking/Telecommuting

Teleworking was once seen as a temporary necessity while Stay-at-Home orders were in place, as well as a potential option for those who had to quarantine. Unfortunately, teleworking is not an option for everyone. Depending on the job sector and individual employee responsibilities, companies may or may not be looking into more flexible working options for their employees. Job productivity did not decrease due to this operational transition and many employees value flexibility. The General Public survey showed that 44% of respondents plan to telework/telecommute in the future if their employer has indicated that this is an option. However, the two other surveys, comprised of MPOs, RPOs, City/Municipal workers, various levels of local government, and transit agencies, indicated that they will be requiring most of their employees to commute to work 5+ days a week.

The PA Association of Realtors supported that teleworking is still popular and will continue to be an attractive option. They anticipated that because of the COVID-19 pandemic, long-term changes in the housing market include an increased desire for detached housing with more square footage, home offices, and storage space, in addition to the observation that office buildings will need to be re-configured in response to increased teleworking.



# Recommendations

Pennsylvania is still working to fully recover from the impacts of the pandemic; however, the solution is not to simply return to a pre-pandemic way of life. Not all previously used processes, systems, and ideas will still be relevant today and going forward. Adaptation is essential and there may be many phases as COVID-19 cases are still present and businesses are recovering. Recommendations focus on adapting to shifting public transit demand, post-pandemic mobility planning, transportation funding, and addressing rural disparities.

## Public Transit Demand

Factors such as e-commerce, teleworking, and adapting to temporarily decreased public transit services have influenced transit demand. Ridership across the nation has not recovered to pre-pandemic levels, and it will likely take five to eight years for transit demand to return to 2019 levels. Public transportation agencies will need to continue to operate flexibly and respond accordingly as ridership levels fluctuate throughout the work week, influenced by teleworking. Current geopolitical conditions have led to rising consumer costs, including rising gas prices, at all levels, contributing to pandemic-related transportation concerns. Transit agencies could take this opportunity to offer fare discounts or deals to attract riders to use their service and market it as a way to save money by discouraging the use of other modes of transportation, such as their personal vehicle. Discounted passes for high school and college students or special summer fares could help introduce additional riders to local transit options.

## Conduct a Transit Development Plan

With transit agencies limited in how much service they can operate, it's vital that all services in operation meet the highest needs of the community with maximum efficiency. Given recent changes in land use and transit demand, the period of post-pandemic recovery provides a significant opportunity to realign services to meet people's travel needs through a Transit Development Plan (TDP). A TDP is a short- to mid-term blueprint for improving local service that provides a set of specific parameters to ensure a well-reasoned approach to adding or reallocating service. The service guidelines and recommendations of a TDP grow from a robust public engagement process, which could itself be a timely way of reconnecting community members and transit agencies after the upheavals of the COVID-19 pandemic.

## Conduct a Fare Adjustment Study to Establish a Fare Policy

An agency's fare policy is a delicate balance between increasing ridership and obtaining sufficient revenue. The price of fares and fare collection methods can affect the affordability, convenience, and travel time of a system, thereby influencing ridership. Before establishing a fare policy, transit agencies should set goals to help set the framework for making decisions regarding revenue.

In California, San Francisco Municipal Transportation Agency (SFMTA) created four goals that its fare strategies were designed to achieve.

1. Incentivizing transit ridership
2. Incentivizing pre-payment
3. Enhancing customer experience
4. Promoting equity

Transit agencies in Pennsylvania are required by law to set a fare policy that keeps pace with inflation. Recent changes in both demand and operating costs make this an opportune time for agencies to ensure that their fare structure is keeping pace with inflation. At the same time, affordable fare policies can be an incentive to potential riders to adopt transit as a cheaper option than driving a personal vehicle.



# Post-Pandemic Mobility Planning

## LAND-USE SHIFTS

With office space requirements shifting due to long-term and permanent work-from-home options, the Pennsylvania commercial real estate market has changed significantly. As land-use patterns shift in response, this presents potential opportunities for communities to integrate multimodal transportation connections. Planning could also promote housing and business development near transit service by way of Transit-Oriented Development (TOD). Low-income and transit-dependent individuals tend to be essential workers, therefore they most likely cannot work from home and must commute to their job. Quicker and more convenient access to transit would allow their commutes to be shorter, affordable, reliable, and accessible. However, the needs of low- and moderate-income citizens should be considered during this planning, as housing surrounding transit service tends to be more expensive.

## SHARED STREETS

During the COVID-19 pandemic, many cities realized that residents needed more outdoor spaces within their communities to safely get outside while still observing social distancing measures. Shared, open, and slow streets were the result, which restricted vehicular access along some corridors and provided ample “pop-up” spaces for walking, biking, outdoor dining, and more. Using shared streets as a permanent installment gives pedestrians a clearer, safer right-of-way, encouraging less dependence on personal vehicles and creating more vibrant main street areas. Shared streets can also benefit residential areas by extending front yards and creating their own public space.

## MAAS COLLABORATION

The pandemic disrupted access to many alternatives to transit, with fewer TNC drivers operating in rural and suburban areas and used vehicles becoming drastically more expensive to purchase. To build resilience into the community, protocols could be established to simplify access to multiple modes of transportation. Mobility as a Service (MaaS) would help to connect people to multiple modes of transportation in their area, increasing their options. Through MaaS, transit agencies and private transportation companies can work together to help provide a seamless multimodal trip that can include vehicle- or bike-sharing and access to trains, buses, taxis, etc.

## MICROTRANSIT

Microtransit programs, such as rabbittransit’s Stop Hopper service and the Area Transit Authority of Central Pennsylvania’s Call-a-Bus service, could be a potential public transportation option in rural and suburban areas where demand is infrequent and geographically dispersed. Microtransit uses van-sized vehicles and provides call-ahead service between points in a designated geographic area.

Microtransit is not as resource-efficient as fixed-route service, so agencies should be strategic in choosing specific zones where microtransit service will deliver the most benefit. One study in California suggests that microtransit can be helpful in areas where fixed-route productivity is below 15 boardings per hour, while anecdotal evidence from microtransit in Pennsylvania suggests that productivity should be as low as 7 boardings per hour before replacing a fixed route with microtransit.



# Transportation Funding

## EXISTING PUBLIC TRANSIT RESOURCES

Currently, transit agencies serving rural Pennsylvania are limited to existing state and federal funding programs, such as federal formula grants and state lottery funding. Only Philadelphia, which is the sole City of the First Class in the state, has the authority to levy local taxes directly for transit. For transit agencies in the rest of the state, limited public funding available for public transportation combined with decreased fare revenues may require pursuing revenue streams from other sources. When transit agencies position themselves as the solution to wider community goals, such as increasing air quality or connecting employers with a reliable employee base, they can negotiate additional funding air quality funds and private subsidies.

### Utilize Congestion Mitigation and Air Quality Funds

Public transportation produces fewer quantities of air pollutants per mile than personal vehicles and therefore can be beneficial to a region's health. Taking public transportation produces 95% less carbon monoxide, 45% less carbon dioxide, and 48% less nitrogen oxide compared to single-occupancy vehicles. The goal of Congestion Mitigation and Air Quality (CMAQ) Program funds is to reduce pollution and transportation-caused environmental effects, as well as reduce congestion.

Although the state and metropolitan planning organizations (MPOs) can use CMAQ funding for transportation projects and programs that meet the Clean Air Act requirements, rural planning organizations (RPOs) are often overlooked for this funding. In Pennsylvania, CMAQ-funded programs are administered by the region's Transportation Management Associations (TMAs), which are mostly concentrated in the Pittsburgh and Philadelphia areas. Expanding the use of CMAQ funds to encompass RPOs and TMAs in rural areas could help address transportation-induced environmental disparities in rural Pennsylvania.

### Privately Subsidized Trips

Implementing trip subsidies, employee transportation programs, or providing last-mile transportation can benefit workers and employers as it allows for reliable and more affordable transportation to workers and for transit services.

- **Employer-Employee Cost-Sharing**  
Employer-employee cost-sharing programs should be evaluated. A percentage of the cost of transportation that will be shared among the employees is determined between the employer and the employees.
- **Employer/Transit Agency Partnership**  
Implementing a fixed route system could potentially be accomplished through a partnership between employers and local transit agencies. This would help to provide transportation for workers from higher unemployment areas to their place of employment.
- **Employer Last-Mile Transportation**  
Another strategy is for employers to provide last-mile transportation options for employees. This could be offered by a single employer/company or a regionally located group, with the cost shared by all employers and service provided to all employees.
- **Human Services Organization Collaboration**  
Many charitable organizations and local human services departments use a portion of their funding to help low-income or at-risk clients access transportation, including reimbursing taxi rides. Transit agencies can work proactively with human services organizations to supply bus passes in bulk as well as to provide rider training for clients who vitally need access to transportation.





## Future Research

While this study has identified the current body of knowledge on post-pandemic public transportation planning practices, there are a range of topics which warrant further attention or deliberation. Multiple studies address how states support public transportation funding needs, including research by the National Academies of Sciences, Engineering, and Medicine (2022), Transportation for America (2021), TransitCenter (2021), and the National Conference of State Legislatures (2015). However, more empirical research is needed on how government agencies that manage public transportation funds can maximize the public's return on investment through their decision-making processes. Specifically, how should governments allocate limited fiscal resources to balance concepts such as accessibility, productivity, and equity? These concepts are pervasive in contemporary publications and federal guidance on how to advance the current state of public transportation. However, it is unclear if decisions to ensure equity and expand accessibility should be undertaken at the cost of reduced productivity.

Current formula-based federal grants include measures and metrics of productivity, but lack direct measures of accessibility and equity.





## Conclusion

In a post-pandemic world, technological adaptation to public transit demand and leveraging federal funding opportunities can help agencies and communities plan for trends and address disparities highlighted by the spread of COVID-19. Instead of seeking to return to normal, adaptation to new services, sectors, and policies that emerged or grew in popularity during the pandemic will be necessary. Many of these services and sectors have been shaped by access to technology, namely high-speed internet and smartphones, reinforcing disparities in contexts where internet access is unaffordable, unreliable, or limited.

Teleworking shifts during the pandemic reinforced public transit as a necessary service for transit-dependent individuals, especially essential workers, and showcased the need for more frequent, accessible, and affordable service outside typical peak periods for office-based commuting. While non-public transportation access was disrupted and less reliable, transit agencies now better understand and focus on core rider demographics and mobility needs. Innovations that streamline and enhance transit travel and the seamless integration of other modes, such as walking and cycling, can improve service for core riders while also serving to attract new or former transit riders.

Because trends in e-commerce and innovations in mobility, such as ridesourcing, microtransit, and real-time trip planning, rely on technology access, economic disparities in rural areas may worsen if action is not taken. The pandemic disproportionately affected rural residents in Pennsylvania due to a variety of factors, including lack of reliable access to the internet, the closure of local businesses and services, and limited public transportation. However, new federal funding sources have identified expansion of broadband as a focus area for economic development and transportation improvements. Enhancing access to high-speed internet also creates opportunities to utilize innovative mobility options, like microtransit, that may benefit individuals in rural areas.

The transit industry's recovery from the pandemic may present opportunities to deliver safer, more efficient, and more effective services than ever before. Asking difficult questions about the imagined future role of public transit, and transit agencies, can help to establish a clear vision and direction for post-pandemic mobility planning.

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FINAL REPORT

Prepared by

**Michael Baker**

**I N T E R N A T I O N A L**

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