RESEARCH REPORT

Making the Case for Improved Bicycling Infrastructure

An Analysis of the Final Mile Bicycle Infrastructure Program

Yonah Freemark
URBAN INSTITUTE

Yipeng Su
URBAN INSTITUTE

Wilton Oliver
URBAN INSTITUTE

Olivia Fiol
URBAN INSTITUTE

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Executive Summary

Cycling infrastructure can help broaden access to mobility by offering residents a low-cost, reliable, and sustainable means of transportation. Yet cities in the United States have thus far failed to systematically expand their cycling networks in a fashion that is safe for users and encourages a mode shift out of cars and into this more equitable and environmentally friendly transport mode. To help stimulate further investment in cycling infrastructure, between 2018 and 2021 the Final Mile program funded communications campaigns, advocacy efforts, and engineering consulting in five US cities. The program set out to test whether philanthropic assistance for municipal biking projects could accelerate city investments in communities where local leaders were already supportive of cycling infrastructure.

To examine the effectiveness of the Final Mile program, we conducted interviews with community stakeholders and collected data in each of the funded cities—Austin, Denver, New Orleans, Pittsburgh, and Providence. We also assembled information about what similar cities elsewhere in the country had done. We found that the program's support for continuous pressure on local officials—including by convening frequent meetings between city staff and cycling advocates, funding advertising, and identifying quantified investment goals—helped encourage all the funded cities to significantly expand their respective protected cycling infrastructure. They did so far more quickly than comparable cities elsewhere in the United States. Though gaps remain in achieving the complete bike networks the cities ultimately hope to build, the program could be a model for advocates looking to inspire local governments to follow through with their policy goals. This report summarizes our conclusions, identifying the successes and challenges faced by this program.

The Final Mile program was premised on three assumptions necessary to support the rollout of improved cycling infrastructure. These assumptions were reflected in program design and implementation:

- **Municipalities need to set ambitious goals for rapidly implementing improvements that prioritize equity.** Final Mile worked to identify cities that were willing to set ambitious, quantified goals for cycling infrastructure rollout that would help ensure citywide access to safe, comfortable facilities for all.
- **In the long term, those goals must be backed by continuous political commitment, supported by leaders in the public and nonprofit sectors.** Final Mile funded a permanent setting for dialogue between public and nonprofit groups in each funded city, with the goals of reducing conflict, identifying the most equitable investments possible, and building momentum even in

the face of project opposition. The program also supported a communications campaign intended to increase resident support for investment in cycling. In so doing, the program was designed to serve as a pressure mechanism that continuously reinforces programmatic goals.

- **Municipalities must have the capacity to undertake programs.** To this end, Final Mile provided funding for engineering technical assistance of new cycling infrastructure in several communities.

Our key findings are as follows:

- **There is considerable interest in expanding cycling infrastructure, and municipalities are the right jurisdictions upon which to focus pressure for doing so.** City governments control most streets and have the ability to reorient street space away from cars and toward bicyclists and pedestrians.
- **Setting a long-term cycling infrastructure goal helped clarify what each city should accomplish**. By committing to invest in a certain number of miles of cycling improvements, city staff felt they had a clear goal to follow. This informed how they prioritized their choices.
- **Continuous pressure on city staff to accomplish goals was an effective way to encourage construction, but it also caused stress.** The Final Mile program continuously emphasized to city staff the importance of achieving the agreed-upon mileage goal. This pressure helped move projects forward but also contributed to some cities' staff feeling overwhelmed.
- **Engineering support filled a key gap in local capacity.** Cities that received technical assistance increased their planning, engineering, and construction work faster than would otherwise be possible. Many cities face chronic shortages in staffing, so this assistance was crucial.
- **The effort to permanently link local nonprofits to the public sector had limitations.** Final Mile project managers successfully organized frequent meetings between city and nonprofit staff, which increased information transfer between these groups. But nonprofits still often felt ignored in decisionmaking. In response, nonprofits conducted independent public campaigns in favor of cycling projects and played an "inside–outside" role, continuing to pressure city staff using tactics from outside the Final Mile program.
- **Communications campaigns may have raised general public support for cycling investments, but in many cases failed to dilute neighborhood opposition to investments.** Interviewees noted that public campaigns conducted by the Final Mile program were largely visible and noticed by residents and political officials. The program was not intentionally designed to

reduce a "not in my backyard" (NIMBY) kind of opposition, but rather to support the creation of a larger group of supportive stakeholders. There is some evidence that these campaigns were associated with increasingly positive views about biking. But the larger group of pro-bike voices failed to reduce the localized neighborhood opposition to certain projects, which imperiled construction in places where city councilors agreed with opponents. Directly addressing NIMBY sentiment may remain a necessary element of such work.

- **The funded cities significantly expanded cycling infrastructure, meeting their ambitious program goals, and did so at a significantly faster rate than comparison cities.** The Final Mile cities considerably expanded the availability of improved cycling networks. Before the program, investment in secure cycling infrastructure in Final Mile cities was statistically indistinguishable from peer cities elsewhere. But after program commencement, the median Final Mile city added protected bike lanes at more than three times the per-capita rate as the average comparable city.
- **Cities still need to complete their full investment plans—particularly in terms of meeting equity goals. Also, much of the new infrastructure was not built at the highest possible level of cycling safety.** Improvements did not ultimately produce systems that ensured access to people of different racial and ethnic backgrounds more effectively than comparison cities. Considerable work also remains toward meeting their proposed citywide cycling-plan goals.

The Final Mile program offers a unique model of philanthropic investment designed to shape municipal policy. In the five funded cities, it helped inform growing interest and support for cycling while aiding municipal leaders in shaping their goals. The program thus contributed to national momentum in favor of improved cycling infrastructure.

Making the Case for Improved Bicycling Infrastructure

The transportation sector is now the single largest source of greenhouse gas emissions in the United States. Its share is also rising, because of motor vehicle dependence and inadequate alternatives, even as the energy sector makes more substantial progress toward lowering emissions.[1] Across the United States, the vast majority of people drive to work, usually alone in their cars or other vehicles. Few people, even in the largest cities, use nonmotorized modes to get around.[2] Overuse of cars as the primary means of mobility also has contributed to the vast social and racial inequities at the core of American society. These inequities in turn have deprived low-income families—particularly Black and Hispanic families—the same opportunities afforded to households with higher incomes and that are white (Sanchez, Stolz, and Ma 2003).

Encouraging a transportation mode shift—getting people out of their cars and into alternatives like biking and walking—is a key element of achieving a more sustainable and equitable society, especially if mobilized in a way that prioritizes the needs of people of color with low household incomes (Creger, Espino, and Sanchez 2018; Freemark and Tregoning 2022). This shift offers the potential to reduce car use, improve air quality, increase public health, and promote a higher quality of life.[3] Evidence from cities worldwide shows that reallocating street space away from cars and toward safe, protected bike infrastructure can encourage reduced car use. Yet such street allocations remain rare in the United States, where cyclists in most cities are exposed to unsafe travel conditions. Advocates and policymakers must ask themselves: How can we best encourage a shift in public investment?

In answer, the Final Mile program, begun in 2018 and funded by the Wend Collective, offers a promising framework for seeking out these results. The program supported PeopleForBikes (PfB), a national organization that promotes expanded bicycling, to spur that mode shift through the development of complete, safe bicycle networks in key cities across the United States.[4] The Final Mile program was premised on three interrelated assumptions that its creators believed core to achieving change at the municipal level. These assumptions are relevant beyond just cycling infrastructure; they could apply to a variety of potential actions.

- First, **municipalities and their leaders need to set ambitious goals for rapid implementation of improvements that prioritize equity.** Final Mile was intended to serve as an accelerant, pressuring local communities to commit to a goal and find the means to achieve it.

- Second, **these goals must be backed by continuous political commitment, supported by leaders in the public and nonprofit sectors, even in the face of potentially obstinate opponents.** Program designers believed that greater involvement by community members and the nonprofit sphere in planning and executing set goals would hold political leaders accountable to their equitable deployment. One major concern of bicycle advocates was that—though theoretical support for infrastructure existed—once projects hit the ground, residents would oppose greater investment, causing a "political valley" in support. As a result, PfB and Wend believed it necessary to use effective communications strategies to "weather" the decline in support. To do this, they worked to create a large group of residents in favor of investments, outnumbering the few individuals vocally opposed to these projects.
- Third, **municipalities must have the capacity to execute projects.** Dedicated funding and staff ensure not only the quality of the projects but also a robust community engaged in the planning process, which is often the first element of a project to be scaled down when resources are constrained.

To test these assumptions, the Final Mile program funded campaigns in five communities: Austin, Texas; Denver, Colorado; New Orleans, Louisiana; Pittsburgh, Pennsylvania; and Providence, Rhode Island. These investments *did not* go directly to the municipal governments for the construction of cycling lanes. Instead, Final Mile used philanthropic support as a mechanism to encourage local action. Final Mile leveraged three general approaches in each municipality.

- To encourage municipal leadership, the program selected communities explicitly based on preexisting political entrepreneurship. PfB and Wend aided municipalities in identifying an actionable outcome related to bike programs. Each city set a goal for a minimum number of high-quality bike infrastructure miles it would build over two or three years. PfB staff working on the project emphasized that cities should invest in safe, secure infrastructure (meaning bike lanes physically separated in some way from car lanes) that formed a cohesive, citywide network.
- To build a long-term commitment to achieving a bike infrastructure goal, the program funded communications campaigns that promoted the importance of safe cycling infrastructure. These campaigns included both earned and paid media, such as online videos, zip code–targeted ads, billboards, and even branded pizza delivery boxes. PfB commissioned an advertising firm, GSD&M, to develop a unified branding campaign deployed in all five cities. The program encouraged local nonprofits to work directly with their city to build on-the-ground support for investments by funding a local program manager, organizing frequent

meetings, and engaging in study trips to Europe. By improving these connections, program organizers hoped they could better dispel myths about cycling use and activate further interest in funding bike facilities.

- To improve municipal capacity, the program funded technical assistance from an engineering consultant to supplement work conducted in city halls. This engineering assistance, provided by Toole Design Group, supported local planning and transportation departments that were updating road designs to improve pedestrian and cycling facilities.

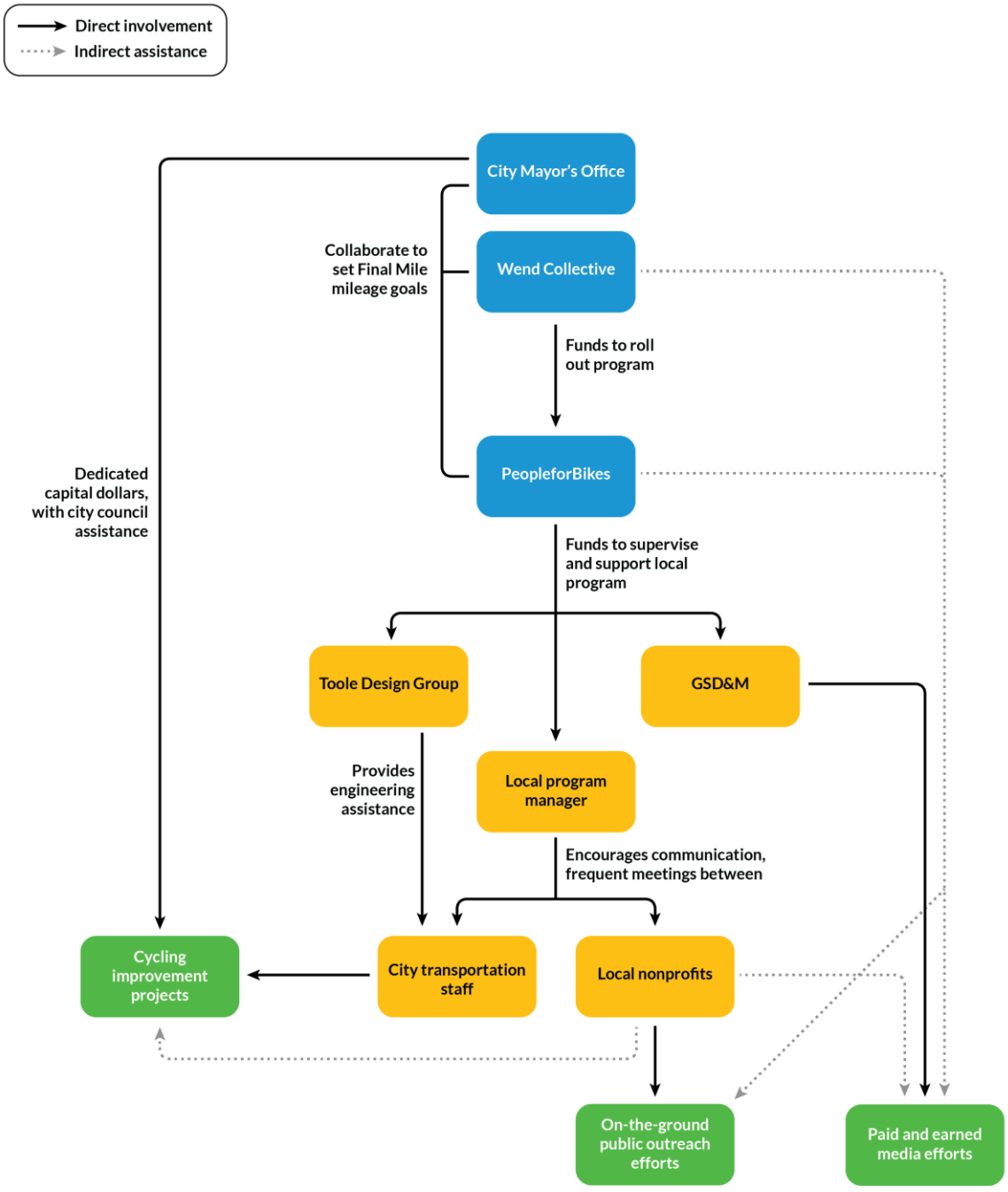
The Final Mile program was designed to alter the relationship between advocates and city staff. Rather than a tense, confrontational battle between antagonists, program members intended to secure a cooperative approach to transportation planning. They attempted to develop a more sympathetic relationship between advocates and city staff to serve as a model for future partnerships between the public sector and advocacy nonprofits. Figure 1 illustrates the components of the program.

Program organizers emphasized that the goal of the program was to build on preexisting local plans by adding capacity. City staff led priority setting, not the philanthropic funders. Final Mile funding neither directly supported infrastructure nor granted funding to cities themselves. Program organizers intentionally designed this funding mechanism because they feared that delivering funding directly to cities would decrease funders' leverage to encourage better collaboration with nonprofits.

This program evaluation is intended to determine the ways—and the degree to which—the Final Mile program encouraged the acceleration of municipal investments in local cycling infrastructure. Did the combination of identifying a key goal, reinforcing a long-term commitment to achieving that goal, and improving municipal capacity to accomplish that goal make better bike infrastructure possible? Did an approach that prioritizes political action and better partnerships between public and nonprofit sectors, backed by philanthropic support, increase equity of access to safe cycling? By studying which elements of the program were successful, and which aspects were less viable, we highlight lessons learned from the program that could be successfully transferred elsewhere to pave the path to more sustainable mobility.

FIGURE 1

Final Mile Program Organization Diagram



Source: Authors' analysis of program.

Bike Infrastructure Can Play an Important Role in Encouraging Sustainable Transportation—but Only if It Is Designed Appropriately

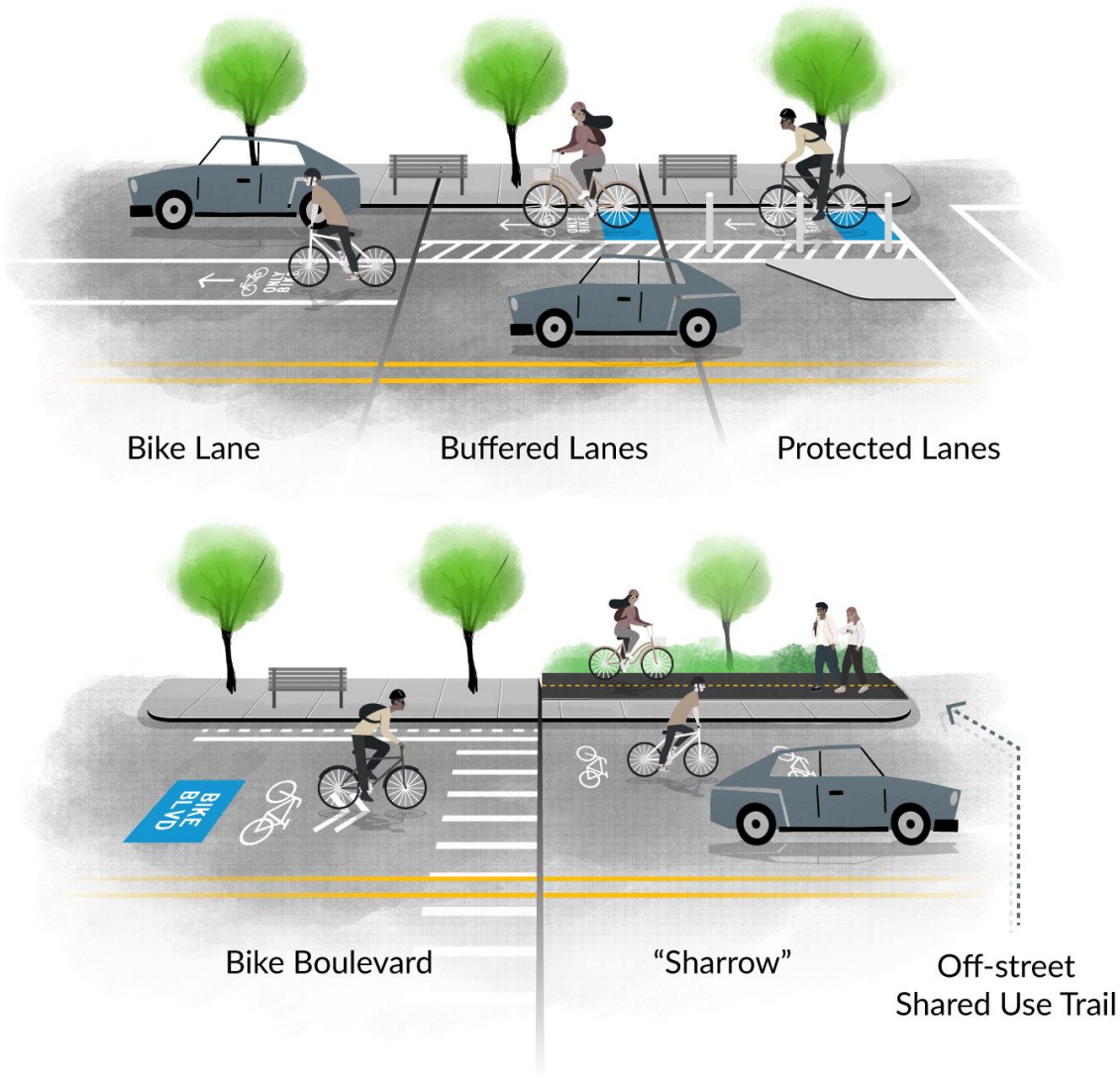
The Final Mile program is premised on the idea that to promote a shift in transportation choices, municipalities must invest strategically in effective, well-designed bicycle infrastructure. In this section, we describe some of the research that supports this claim. Cities that fund effective bike lanes historically have been able to prompt a mode shift away from car travel to sustainable modes. The success of these lanes, however, depends on ensuring not only that the infrastructure is—and feels—safe but also that it forms part of a network.

Cycling infrastructure can take several forms of varying quality (NACTO 2014), illustrated in figure 2. The differences between infrastructure types influence how effective an investment may be in encouraging bicycle use. *Sharrows*[5] are painted icons in a road lane shared with automobiles that indicate bicycles are allowed or encouraged. Small-scale streets may be transformed into *bicycle boulevards* that prioritize bicycle movement in shared lanes by minimizing car traffic and slowing speeds. *Bike lanes* are painted areas on the street reserved for cyclists, typically on the right side of the street but sometimes on the left, and occasionally operated in contraflow, meaning in the opposite direction as car traffic. These lanes are sometimes painted entirely green or red, but more often than not simply marked off with white borders. *Buffered bike lanes* include some physical separation between bike lanes and car traffic beyond just paint. *Cycle tracks* and *protected bike lanes* are lanes reserved for cyclists, often separated vertically from car traffic (meaning the lane is a foot or so higher off the ground than car traffic). Last, *shared-use off-street trails* are lanes for cyclists and pedestrians separated entirely from the street, and often located within green spaces. Collectively, these investments can be combined with improvements in intersections, traffic signals, and signage to maximize cycling access to the street. The cities we profile in this research leveraged a combination of these infrastructure types as they rolled out their bicycle programs.

Many studies have demonstrated the effectiveness of bike infrastructure in encouraging cycling, even as it typically has little negative impact on automobile traffic (e.g., Burbidge and Shea 2018). Cross-sectional analyses comparing city bike infrastructure with the share of commuters commuting by bike show that those cities in the United States with more lanes have a higher likelihood of more riders (Dill and Carr 2003). Pucher, Dill, and Handy (2010) also show that cities worldwide that invest in improved infrastructure are likely to benefit from more bike trips.

FIGURE 2

Illustration of Various Cycling Infrastructure Types



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Source: Urban Institute.

Researchers who have examined the impact of bike infrastructure show a direct relationship between having cycling facilities on the ground and cycling. Parker et al. (2013) demonstrate that a new bike lane in New Orleans dramatically increased biking not only on the streets impacted but also overall in the surrounding neighborhoods, meaning that the bike lane focused cycling on the streets where the improvements had been made and *also* encouraged more cycling. In this case, though men were more likely to use lanes than women, cycling expanded among people of all genders, races, and

ages. Similarly, an expanded cycling network in central Lisbon, Portugal, produced a 350 percent increase in biking use (Rosa, Cambra, and Moura 2020). New cycling infrastructure is sometimes popular in communities with lower incomes and a higher share of people who are ethnic minorities (Wang and Lindsey 2019), though some residents fear that such improvements will spur gentrification and displacement—an issue to which we return hereafter.

The attractiveness of biking infrastructure for cyclists depends on the quality of facilities. In a comparison of the impact of investments in sharrows versus bike lanes, Ferenchak and Marshall (2016) show that streets where bike lanes were installed had significantly larger increases in bike traffic than those where only sharrows were implemented. Riders will respond to better infrastructure by changing their travel patterns. Tilahun, Levinson, and Krizek (2007) show that people are willing to travel up to 20 more minutes to switch from unmarked, on-road bike facilities to off-road bike trails that are separated from car lanes. If cycling infrastructure is intended to promote increased levels of physical activity—essential for public health and wellness—then design matters. Indeed, street infrastructure improvements are likely to build bike use in all sorts of neighborhoods, regardless of land-use characteristics or demographics (Cervero et al. 2009).

The degree to which people cycle is influenced by the quality of infrastructure in terms of how *safe* people feel when they are biking (Akar and Clifton 2009). Sharrows are considerably less safe than bike lanes, suggesting that sharrows alone may be inadequate to generate the sensation of safety needed for people to trade cars for cycles (Ferenchak and Marshall 2016). Separated lanes are most effective in building a sense of safety (Burbidge and Shea 2018; Habib et al. 2014).

A perception of cycling safety is also produced by the concept of safety in numbers (Osama and Sayed 2016). People who see other cyclists around them are more likely to be willing to get on a bike, especially in the context of streets dominated by car traffic. They are also more likely to travel by bike if they gain access to a broader cycling-path network, ensuring their ability to travel not just between two individual destinations but across an entire metropolitan area. Such a network strategy can be especially effective in generating trips if cities deploy it quickly as a single investment (Xu and Chow 2020). The links between bike lanes and other amenities, like good bike parking or shower facilities, can also influence the degree to which people choose to cycle (Cervero, Caldwell, and Cuellar 2013).

This research demonstrates that cycling infrastructure plays an essential role in encouraging people to get out of automobiles and onto more sustainable transport modes. But the design of that infrastructure matters: separated lanes arranged in a network are more likely to attract more riders, largely because they give riders a greater sense of safety. This is the sort of network configuration that

the Final Mile program has emphasized. But in order to build such infrastructure, political support is needed at the municipal level. We now turn to the question of how to build such support.

Improving the Transportation System Requires Political Leadership and Effective Links with Community Members

The Final Mile program was a political initiative largely intended to encourage local leaders to alter their investment strategies to prioritize cyclists. This focus on political actors sets the program apart from other initiatives, such as those promoted by professional organizations like the National Association of City Transportation Officials and the American Planning Association, which develop staff capacity and knowledge about best practices for bike infrastructure (though Final Mile provided support in those realms as well). As we describe in this section, the program reflected that transportation infrastructure is political in that it generates debate and disagreement. Final Mile's encouragement of productive exchanges between public sector and nonprofit groups also reflected the fact that transportation projects need broad support from within and outside government to be successful over the long term. This is particularly true because substantial increases in biking depend not only on cycling infrastructure but also other local policies, such as complementary land uses that minimize the need for car travel (Pucher, Dill, and Handy 2010).

Despite the undeniable benefits of improved cycling infrastructure from the perspective of attracting new riders, actually investing in projects frequently solicits considerable controversy. This conflict reflects disagreement on a number of fronts: whether responding to climate change by altering transportation choices is an accepted strategy; whether cycling is an acceptable mode of transportation compared to automobiles; where in a community new investments should be located; and whether the goal of transportation should be to move people as quickly as possible, or rather to connect people to destinations within their communities. As a result of these disagreements, political actors, community groups, and residents interested in promoting cycling must identify mechanisms to win support—including sometimes from one another.

Examining case studies from around the world, researchers cite several political factors key to success in achieving increased investment in cycling infrastructure (Koglin 2015; Siemiatycki, Smith, and Walks 2016; Wilson and Mitra 2020):

- identifying improvements that can "piggyback" on top of existing public works projects, to prevent cycling projects from being perceived as separate or isolated

- leveraging external funding, not just public investment
- rerouting cycling projects preemptively to avoid public controversy
- building up public champions who stake their reputations on cycling projects, doing so by seizing unique windows of opportunity
- supporting changing attitudes about cycling, including through an altered local planning and engineering culture
- developing an aggressive public communications program

The Final Mile program focused on building several of these goals, such as adding new philanthropic money to supplement public support, identifying political leaders willing to promote cycling as a major goal, and supporting communications. But Final Mile was also premised on improving links between government and nonprofit advocates. These groups are broadly perceived to be at odds with one another in accomplishing the goal of adding cycling infrastructure.

One explanation for this perceived disagreement is the real experience of bike projects being subject to tremendous controversy, often from residents along routes who protest the idea of allowing street changes. There is also historical experience of public protests *in favor* of cycling infrastructure, such as in the Netherlands, or at Critical Mass events in the United States (Koglin 2015; Stehlin 2014). For or against, the ways contestation is experienced and reflected in choices on transportation projects are not equally shared.

Black and Hispanic communities in the United States have made the compelling case that public processes—particularly related to cycling—have been historically unjust in focusing on the desires and needs of whiter and wealthier residents (Lubitow and Miller 2013; Stehlin 2015). Some scholars argue that bike infrastructure is associated with gentrification, encouraging whiter and wealthier inhabitants to move into communities that previously were largely inhabited by people of color with lower incomes (Stein 2011). Recent research, however, indicates that bike lane projects do not appear to be associated with significant changes in socioeconomic status or racial composition of impacted neighborhoods (Ferenchak and Marshall 2021).

Even so, the sentiment that bike lanes are “white lanes” remains an obstacle to widespread resident support for cycling projects (Lubitow 2016). Expanding partnerships between community organizations and government entities undertaking infrastructure projects, which the Final Mile program proposed, may resolve this issue somewhat. The examination of Lubitow, Zinschlag, and Rochester (2016) of a bike program in Chicago, for example, shows how a community bike shop

served an important role in expanding engagement around cycling in that city. In so doing, support for investment expanded.

Such public–nonprofit partnerships have become more common across public service programs, with the idea that they aid in identifying better policy options and bringing more people to the table in the process (Hawkins and Wang 2012). Alexander and Nank (2009, 364) note such partnerships can expand trust while "generat[ing] ideological consensus and domain consensus . . . through sharing information, integrated responsibilities and authority, and collaborative decision making." In a study of municipal sustainability policies, Portney and Cuttler (2010) demonstrate that those cities with a more vibrant nonprofit sector—especially one with which local officials engaged directly—were more likely to achieve sustainability goals.

An important question to consider, though, is how partnerships between nonprofits and governments are established and what roles each member of the partnership takes on, since each member could assume a wide variety of responsibilities in cooperative work. The Final Mile program focused on supporting nonprofit groups as what Feiock and Andrew (2006, 759) define as "advocate/lobbyists." This allows nonprofits to aggregate "diverse values and policy interests . . . and represent [them] to the political system." This moves beyond the government's typical role, they argue, of representing the majoritarian view.

If scholars have pointed to several examples of improved cycling infrastructure, and if it is clear that such investments can produce the increases in biking that could benefit communities from the perspective of increasing sustainability, most communities still provide inadequate resources for cyclists. In most US cities, biking feels—and is—unsafe, and most people stick to driving whenever possible. Unlocking the potential for more biking remains a crucial need.

We are thus left with several conclusions from existing research. Bike infrastructure, if well designed in terms of safety and creating a network, can serve as an effective inducement for people to begin cycling. Yet such infrastructure, like other forms of public services, is politically contested and generates debate. Political officials have successfully implemented bike infrastructure improvements, but to do so, they have had to seize unique windows of opportunity, and sometimes work with other organizations to achieve their goals. There is no easy solution to generating better bike infrastructure quickly. The Final Mile program was designed to test a new approach to doing just that.

Our Research Approach

To study the rollout of the Final Mile program, we conducted a mixed-methods research program. We collected data and engaged a series of interviews with stakeholders in each case-study community. We also used geospatial analysis to compare the rollout of improved bike infrastructure with what has occurred in other, similar cities around the nation. Our findings should not be construed as fully *causal* in nature: though we collected quantitative data, the individual nature of each community studied, along with the short timeline elapsed since the Final Mile program began, made it possible that other trends beyond those we describe here can explain at least some of our identified outcomes.

Research Questions

Our research examines several questions at the core of understanding Final Mile's effectiveness in generating local support for cycling infrastructure in cities across the United States:

1. **Program mechanics.** How did the Final Mile program operate in the five funded cities? Who were the key players?
2. **Infrastructure**. What kinds of cycling infrastructure did the program produce, and how much was built, compared to peer cities?
3. **Communications.** To what degree were the public-communications elements of the campaign effective in building local support for infrastructure?
4. **Leadership and partnerships.** Did the program's design successfully commit local leaders to direct their cities to build more infrastructure than they would have otherwise? How did relationships between the public sector and advocacy organizations change over time, and how did these relationships influence outcomes?

We examine each of these research questions in this report. We hypothesize that Final Mile's unique combination of advertising, polling, and partnerships between government and nonprofits successfully expanded access to cycling infrastructure in the funded cities beyond what occurred in peer cities. Because our research evaluated program rollout in five separate cities, we were interested in how the specific stakeholders and government policies in each location altered outcomes. Comparisons can help elucidate what specific elements are most likely to set cities up for success.

Final Mile Program Framework

The Final Mile program was designed to encourage partnerships among philanthropic, nonprofit, and public sector groups working to improve bicycle infrastructure. In each funded city, the mayor agreed to implement cycling improvements and set a mileage goal for the amount of new infrastructure to be created. Though PfB and Wend encouraged cities to ensure that as much of the new cycle network was separated and protected as possible, cities were allowed to count other types of infrastructure to meet the program's goals (such as bike lanes or bike boulevards). The program was funded by the Wend Collective, a philanthropic organization (though the cycling infrastructure itself was funded by the cities). Throughout the program's rollout, Wend served as a major stakeholder in discussions with staff and other interested individuals in funded communities, with Wend's director of campaigns and sustainability coordinating much of the organization's work.

Wend's funding, which was budgeted at roughly $11.3 million for the first three years of the program, was mostly directed to PfB, a nonprofit organization that has been supporting local bike improvement programs throughout the United States for two decades. PfB's vice president of local innovation and director of local innovation were the program's primary team leaders. They worked directly with city staff and other involved stakeholders as the program rolled out.

PfB's approach varied depending on the city funded, but in each selected community, the organization identified a program manager, who was funded to lead program activities, organize frequent meetings between city staff and nonprofit groups designed to coordinate among stakeholders, and interact with city government staff and nonprofit organizations on the ground. This manager was either a member of a nonprofit organization (in New Orleans, Pittsburgh, and Providence) or an independent consultant (in Austin and Denver). The manager was tasked with holding frequent meetings and targeting local expenditures, such as on advertising campaigns. In each city, PfB helped organize and maintain a local steering committee comprising public and nonprofit actors.

PfB did not fund any physical infrastructure as part of the program. Final Mile, however, did support several other major areas of activity. First, PfB funded GSD&M, a national advertising firm, to develop communications campaigns for each of the cities to support the effort. The goal was to develop social media distribution and print, billboard, and other messaging that would reinforce the program and encourage local efforts. Second, PfB provided funds to Toole Design, a street design and engineering firm, to augment city staff capacity to develop plans for bike improvements; this assistance was particularly deep in New Orleans, Pittsburgh, and Providence. Last, PfB led several

foreign trips to cities such as Seville, Spain, to demonstrate best practices for investment in improved cycling infrastructure.

Case-Study and Comparison Cities

The Final Mile program built off a similar but less comprehensive program called the Big Jump, also organized by PfB. That three-year program began in 2014 and supported improved cycling in 10 cities nationwide (Austin; Baltimore; Fort Collins, Colorado; Los Angeles; Memphis; New Orleans; New York; Portland, Oregon; Providence; and Tucson). Wend tasked PfB in fall 2017 to identify five or six cities that could benefit from an expanded program. As part of this work, Wend conducted an extensive scoping program for cities across the country to identify which could be most effectively funded by Final Mile to produce major improvements to cycling infrastructure.

At the core of this scoping work was a preliminary application sent out to US cities, counties, and metropolitan areas. Eighty-one jurisdictions, mostly cities, responded, providing information about current status of cycling infrastructure and staff assessments of present public support for biking.[6] From these jurisdictions, PfB conducted more in-depth analyses of 22 of them: Atlanta; Austin; Bellevue, Washington; Denver; Detroit; Fort Collins, Colorado; Fort Lauderdale; Indianapolis; Kansas City, Missouri; Los Angeles; Louisville; Memphis; Miami; Nashville; New Orleans; Pittsburgh; Portland, Oregon; Providence; Queens County, New York; Salt Lake City; Seattle; and Tucson. The organization analyzed each according to an assessment of local urban mobility challenges, demonstrated political will, political readiness, established partnerships, and potential to serve as a national model. Wend and PfB staff met with officials in the mayor's offices of many of these communities to gauge their interest in the Final Mile program, with the goal of identifying those cities that were most focused on finding the means to actually achieve beneficial infrastructure improvements.

Ultimately, PfB and Wend selected Austin, Denver, New Orleans, Pittsburgh, and Providence as Final Mile cities (though not at the same time; Pittsburgh and Providence were selected later). These five cities thus serve as our primary case studies in this work. The other 17 cities considered but ultimately rejected serve as comparative studies. Note that this comparison is not entirely even. The five Final Mile cities were specifically selected because they met certain criteria—notably, having preexisting political leadership in favor of bike lanes and established partnerships. This may have been less the case for the other cities. That said, staff in all cities expressed interest in joining the program, indicating preprogram momentum for cycling in each. This comparison is therefore useful in providing

a national scope for how bicycle infrastructure was undertaken in US cities during this period, and in identifying the specific contributions of the Final Mile program.

Data Collection

We worked with PfB to assemble data relevant to the rollout of the Final Mile program. These data included

- results from polls funded by Wend in each of the case-study cities over the analysis period, focused on issues such as interest in cycling;
- documentation of program expenditures;
- documentation of communications programs, such as advertising efforts;
- PfB-developed information related to the investigation of potential cities for investment as well as progress in program investments over the Final Mile completion period; and
- a list of people involved with the program in each of the cities where funding was allocated.

We also worked with PfB to collect a preliminary dataset on cycling infrastructure in each case-study and comparison city. These data were derived from OpenStreetMap but assembled by PfB as part of its Bicycle Network Analysis program. We collected information on cycling network data annually from 2017 to 2021. To conduct our geospatial analysis (described hereafter), we also compiled data at the block group level from the 2015–2019 American Community Survey. To augment this analysis and fully develop the dataset, we gathered as much annual cycling investment data from the Final Mile and comparison cities as possible, bringing together this information from web sources and emails to city officials.

One concern about using OpenStreetMap data is that they are assembled voluntarily by individuals working around the world. As a result, they may not accurately represent actual cycling networks at any specific point in time, and they may be more reliable in some cities than others. It is therefore possible that network-related information in some cities is over- or underestimating cycling infrastructure. Even so, there is no better national source of data on cycling networks, so we chose to rely on this dataset for parts of our analysis.

We do not analyze changes in bike use in the Final Mile cities over the study period, for two reasons. First, because the program only began a few years ago, it may be inappropriate to expect significant, measurable impacts on biking use over the study period. Second, as of this report's writing,

the best available national-level data on cycling—Census Bureau–produced information about transportation mode share to work—were last available at the municipal level in 2019, and data for 2020 and 2021 are likely to have been significantly impacted by the COVID-19 pandemic, which may or may not have long-term implications.

Interviews with Stakeholders

From April through September 2021, we conducted 34 interviews using teleconferencing technology. Each interview lasted up to one hour. The semistructured interviews focused on understanding the interviewees' roles in Final Mile processes, specific leadership profiles of those involved, and what made them particularly engaged in undertaking this effort. Outreach was done via an email letter asking recipients about their interest in being interviewed and encouraging them to reach out with questions about the interview process and research project.

To get a full scope of biking and biking infrastructure in each of the funded communities, our team aimed to interview a diverse array of stakeholders across different sectors. Several of the interviewees served as project managers of Final Mile program activities and had a detailed understanding of program operations. Others had been involved in biking and bike infrastructure separate from the program. Table 1 shows the breakdown of our interviewees by sector. Note that Austin, New Orleans, and Providence had a relatively small number of direct interviewees. To better understand what happened in these cities, we relied on national experts (consultants from Toole and GSD&M) and conversations with PfB and Wend staff.

TABLE 1

Overview of People Interviewed to Understand Final Mile Program Rollout

	Public sector	Nonprofit sector	Consultants	Overall
Austin	1	2	1	4
Denver	4	4	1	9
New Orleans	2	2	NA	4
Pittsburgh	3	3	1	7
Providence	1	1	1	3
Nationwide	NA	2	5	7
Total	**11**	**14**	**9**	**34**

Source: Authors.

Note: NA = not applicable.

We identified interviewees through a field scan and by reviewing the list of city contacts provided by PfB. We then used snowball sampling to identify additional interviewees who might provide relevant details about the project. The interview protocol (appendix A) covered the following topics:

- Descriptively, how did the Final Mile program operate?
- How did the program's elements vary?
- What were the key mechanisms by which Final Mile strategies were linked to specific outcomes?
- Who were the key players in each of the impacted communities?
- How did the relationships between the public sector and advocacy organizations change over program duration?
- What elements of the program did local stakeholders believe were more or less effective?
- To what degree did communities impacted by the Final Mile program produce results in terms of transportation infrastructure that were different from those of other, similar communities throughout the country?

After receiving verbal consent, our team conducted interviews while taking written notes and recording audio to accurately capture feedback. When mentioned in the report, interviewees have been anonymized to ensure confidentiality. Once interviews were completed, we recorded key themes from each interview in a long-form document, which we used to code for major themes to understand the impact of the Final Mile program on the rollout of improved cycling infrastructure.

Though interviews provide useful insight into how local stakeholders are challenging themselves to invest in expanded cycling infrastructure, we acknowledge that we are representing the program at

a single point in time. It is possible that, had our interviews occurred at another point in the program rollout, they would have reflected different views from affected individuals.

Geospatial Analysis

To understand the geographic distribution of cycling facilities throughout each of the case-study communities, as well as the comparison cities, we conducted a series of analyses leveraging data from OpenStreetMap, as described earlier. These analyses allowed us to compare investments in different communities, identify changes over time, and contrast outcomes across demographic classifications.

We began by identifying cycling infrastructure. Using OpenStreetMap data, we identified streets with bike lanes and those with more protected bike infrastructure (including buffered lanes and cycle tracks). We did not define streets with sharrows as having cycling infrastructure, as these streets have no space uniquely designated on them for cyclists. We also identified bike paths defined as shared-use off-street trails. Because many of these trails do not serve as part of the citywide bike network (e.g., some are dead-end paths through parks), we manually reduced the qualifying off-street network just to those paths that link between streets at both ends or line the edge of parks. For each city, we tracked changes in the length of the available infrastructure over time.

Then, using this refined dataset, we conducted a series of geospatial analyses on all Final Mile and comparison cities. We compared the location of the cycling infrastructure network with Census block group data related to local racial and ethnic demographics, income, and overall population. We also pursued a network analysis approach to understand access to key sites in each community (e.g., libraries). Our goal in each case was to determine whether cycling infrastructure that has been completed has achieved the goal of creating more equitable access based on a complete network. Each of these analysis approaches is detailed in the following sections.

Demographics and Final Mile Commitments of Five Case-Study Cities

The five case-study cities—Austin, Denver, New Orleans, Pittsburgh, and Providence—vary across numerous demographic measures and local characteristics (table 2). By population size and land area, Austin ranks largest; it has more than 5 times the population of Providence and nearly 18 times the area. Providence is the most densely populated, followed by Pittsburgh. Households in Austin and Denver have the highest median incomes of the five cities; households in the other cities make

considerably less. Walking and cycling to work are most common in Pittsburgh, where 13 percent of commuters did so in 2019, and much less common in Austin, where only 3 percent of workers walked or biked to work that year.

In all five cities, at least one-third of residents are Black, Hispanic, or Asian. New Orleans is home to the largest share of Black residents (58 percent of the population). The largest share of Hispanic residents (44 percent) lives in Providence, and the share of Asian residents is largest in Austin (8 percent). In New Orleans, people of color comprise 69 percent of the population, the highest share of the Final Mile cities. Residents of all of the cities are liberal on the political spectrum, but Providence's are the most liberal of this group.

TABLE 2

Characteristics of Final Mile Cities

	Austin	Denver	New Orleans	Pittsburgh	Providence
Total population	979,263	727,211	390,144	300,281	179,875
Land area (sq. mi.)	320	153	169	55	18
Final Mile mileage goal	100 mi	100 mi	75 mi	50 mi	43 mi
Bike infrastructure funding commitment	$23 m	$23 m	$40 m	$22 m	$15 m
Total municipal expenditures (2017)	$3.85 b	$3.57 b	$1.56 b	$850 m	$990 m
Density (people/sq. mi.)	3,061	4,744	2,303	5,423	9,773
Median household income	$75,413	$75,646	$45,615	$53,799	$50,097
Resident ideology (on a −1 to +1 liberal-to-conservative scale)	−0.53	−0.48	−0.51	−0.49	−0.79
Racial/ethnic demographics					
White (non-Hispanic)	*48%*	*55%*	*31%*	*64%*	*32%*
Black (non-Hispanic)	*7%*	*8%*	*58%*	*23%*	*15%*
Hispanic/Latino	*34%*	*29%*	*6%*	*4%*	*44%*
Asian	*8%*	*4%*	*3%*	*6%*	*5%*
Commuters traveling to work by walking or biking	3%	8%	9%	13%	10%

Source: 2019 American Community Survey 1-year estimates; PeopleForBikes 2021 Quarter 3 Update; Chris Tausanovitch and Christopher Warshaw (2014), City-Level Public Preference Estimates, https://americanideologyproject.com/; Lincoln Institute of Land Policy, "Fiscally Standardized Cities," 2017, https://lincolninst.edu/research-data/data-toolkits/fiscally-standardized-cities/search-database.

In table 2, we also document the Final Mile mileage goal and funding commitment for each of the program communities. The population of each city is roughly associated with its municipal spending, its Final Mile mileage goal, and its Final Mile funding commitment. That said, Providence's mileage goal was the highest per capita (24 miles per 100,000 residents), versus 19 for New Orleans, 16 for Pittsburgh, 14 for Denver, and 10 for Austin. Compared to total municipal expenditures, New Orleans and Pittsburgh devoted greater resources to completing the program (equivalent to about 2.5% of the

annual city budget) versus the other cities (1.5% and below). Still, Austin and Denver had much larger sources of funding for cycling on hand, outside of that specifically dedicated to Final Mile.

Next, we provide brief overviews of each Final Mile city, along with their history as part of the program. All cities that joined the Final Mile program agreed in advance to direct funds to implementing dedicated, safe cycling infrastructure. Before announcing their proposed goal for improved cycling infrastructure, they held conversations with Wend and PfB staff to encourage an increase in the goal, to which all ultimately agreed. All also agreed that their priority was to at least double cycling trips taken in the city over the long term, specifically with the goal of encouraging equitable outcomes, and to do so in a way that committed to the goal of a cycling network (rather than a series of disconnected lanes) with as much protected infrastructure as possible. PfB and Wend operated on the general concept that "for just a little piece of the road, we can all have peace on the road," the idea being that protected bike lanes would appeal to both cyclists and drivers. The history we document here is based on interviews conducted with stakeholders as part of this project and data compiled from PfB.

Austin, Texas

Austin finalized its biking master plan in 2014, with the goal of developing an "All Ages and Abilities" bicycle network.[7] The city further supported this plan in 2019 with the Austin Strategic Mobility Plan, which identified a Bicycle Priority Network for near-term improvements.[8] The city's goal is to increase the share of people walking, biking, or taking transit to work to 50 percent in 2039, up from 6 percent today. Austin, previously a member of the Big Jump cycling advancement program developed by PfB, became a member of the Final Mile program in early 2019. Austin's proposal was to partner with PfB to increase network buildout from 50 to 100 miles by the end of 2020 (later extended to 2021), under the local name MoveATX. PfB contracted to a local political consultant to serve as project manager.

Political leaders began working to develop public support for implementing the plan. In 2016, the city council put Proposition 1 on the ballot. This $720 million bond, supported by 60 percent of voters that November, included funds for corridors throughout the city, much of it improved pedestrian and cyclist infrastructure.[9] In 2020, the city council, seeking to build on this investment, placed the $460 million Proposition B on the ballot. Supported by two-thirds of the city's voters, Proposition B provided $80 million for sidewalks and $120 million for bikeways and urban trails, plus more for other pedestrian and cycling improvements.[10] This effort was largely spearheaded by the Final Mile project manager. On the same day, Austin voters also approved Proposition A, which funded the creation of a

new city light rail system. These funds have helped the city pay for the major improvements in cycling infrastructure at the core of the Final Mile program.

Denver, Colorado

Denver has a long history of investing in cycling infrastructure, but it made significant progress with the completion of the Denver Moves plan in 2015 and the 2017 Mayor's Mobility Action Plan, both of which established clear goals for improved biking conditions.[11] As part of its Final Mile application, Denver proposed to invest in about 100 miles of bikeways, with over 70 percent meant to be low stress, meaning clearly separated from automobiles.

The city's Final Mile initiative, once approved by PfB, commenced in January 2019. To manage Denver's Final Mile activities, PfB hired a local project manager who was an external communications consultant. Their job was to organize interactions between city government and nonprofit leaders, such as those in Bicycle Colorado and Denver Streets Partnership (these two nonprofits work together systematically). Denver Streets Partnership was contracted to conduct bicycle education programs and to use community-based "street teams" to engage with local residents.

As with Austin, Denver supported its mobility initiatives through fund allocation and ballot measures. The 2017 "Elevate Denver" general obligation bond provided $18 million for bikeways citywide.[12] In the following years, the city included $23 million in new funding for bike infrastructure in capital improvement plan budgets, supported by unspent dollars originally allocated to other projects. In 2021, Denver residents approved Question 2C, which funded $63 million in mobility improvements, a significant share of which was targeted at improving cycling infrastructure.[13]

New Orleans, Louisiana

New Orleans commenced its Final Mile program in late 2018. The city's stated goal was to commit $10 million to build out additional bicycle infrastructure, with a complete network buildout by the end of 2020 (this deadline was later extended to 2021). The city committed to using unspent capital bonds funds to achieve 75 miles of a low-stress cycling network. The city had created an Office of Transportation in 2018, whose missions included "to prioritize a people-centered approach to planning our streets that emphasizes livability" and "to push for transit equity so citizens are better connected via transit and bike to jobs and services."[14]

To manage the program, PfB contracted with Bike Easy, a local nonprofit. Bike Easy also served as a consultant to engage with the community and to manage the communications work performed by the Spears Group, a local media consultant. At the same time, PfB contracted with the University of New Orleans to conduct bike counts, and with Toole Design Group to provide technical assistance services to the city as it designed its implementation plan.

Working with Toole, the city developed the Moving New Orleans Transportation Action Plan, which was finalized in May 2019. It then approved a Bikeway Blueprint in September 2020.[15] This Blueprint was designed to ensure the complete implementation of safe, separated cycling facilities throughout the community, building off what was begun as part of the Final Mile program.

Pittsburgh, Pennsylvania

Pittsburgh's local leadership saw investment in improved cycling and other transportation as a key priority. In 2017, the mayor and city council formed a new Department of Mobility and Infrastructure, one of whose goals was to support the implementation of expanded bike infrastructure.[16] As part of this effort, the city began the development of the Bike(+) cycling master plan, which the council approved in June 2020.[17]

Pittsburgh's activation as part of the Final Mile program, however, came later than those in Austin, Denver, and New Orleans; the city only joined the project in early 2020 (which means our analysis, as for Providence, was based on a short timeline). But the city's investment in the program came after several years of involvement in the Big Jump program, also coordinated by PfB. The city of Pittsburgh agreed to commit $22 million to support bike investments, with which it proposed to fund 60 miles of new or upgraded bikeways citywide by December 2021. Of this mileage, the city committed to 30 miles of protected bike lanes. The city's funds were derived from an unspent capital budget.

PfB contracted with Bike PGH, a local nonprofit, to serve in the primary leadership role for the project. The head of Bike PGH served as the Final Mile program manager. In this role, Bike PGH was to lead workplan development and facilitate communication between partners. This leadership role would include media outreach and direction of community interactions. PfB also contracted with Healthy Ride, the local bike-share system, to improve outreach to residents as part of its effort to better understand community needs; and with Toole Design to provide technical assistance for the city as it updated its bicycle master plans and street designs.

Providence, Rhode Island

Providence joined the Final Mile program in early 2020. The Providence plan was based on public investment of $15 million in unspent existing capital funds. The city expected to fund 43 miles of bikeways, of which 31 would be protected bike lanes. As part of the Final Mile program, PfB contracted with Toole Design to provide technical assistance to the city. PfB selected the head of the Providence Streets Coalition, a local nonprofit, to serve as project manager for the Final Mile program. PfB also worked to develop a street team in the city to work with communities citywide to promote the benefits of cycling.

As part of the Final Mile program, the city of Providence piloted a "Great Streets" program of street improvements, building on a plan approved by the city council in January 2020, itself based on neighborhood meetings that occurred in 2019. City staff held meetings regarding specific potential improvements throughout 2020 and 2021.[18]

Impact of the COVID-19 Pandemic

Our research examines the experience of cities in the midst of the COVID-19 pandemic. One consequence is that it is not clear whether the conclusions we make are generalizable. In other words, we cannot be sure that communities and stakeholders we profile acted in a unique way because of the health emergency. The special conditions cities continue to face during this period may be something to learn from, or society may eventually return to pre-pandemic conditions.

Nevertheless, the Final Mile cities advanced their cycling infrastructure plans despite the pandemic. All cities transitioned relatively seamlessly from in-person engagement programs to virtual ones. To some degree, this meant that efforts to reach out to households one on one, door to door were challenged. On the other hand, it meant new opportunities to engage directly with a wide spectrum of the population through the web. And despite the rise of working from home that characterized the pandemic, people continued to move around—including by bike—even during the height of the crisis.

All cities experienced delays in plan rollout. In the pandemic's initial months, construction ground to a halt and city staff focused on more pressing priorities in all five municipalities. Since mid-2020, cities generally have resumed their construction activities, but new problems have become apparent, such as rising construction costs and high demand for labor. In New Orleans, for example, construction capacity was severely limited by few available contractors.

We describe issues raised by the pandemic in this report, but we do not focus on them.

Improving Cycling Begins with Municipal Support

The Final Mile program focused its attention on the municipal scale. This choice was informed by the fact that local governments (e.g., cities and towns) typically control the street right-of-way and—subject to state and federal requirements—have the ability to reallocate parts of it away from automobile lanes and toward space for cyclists. In many cases, such reallocations *must* occur through action by local leadership, such as mayors, city councilors, and departments of transportation or public works, because federal and state governments typically do not mandate the specific allocation of road area to different needs.[19] To build coherent action in favor of better cycling infrastructure, then, promoting local action is vital. Doing so can build on growing interest in supporting cycling investments.

Municipal Investment in Multimodal Infrastructure

Whether municipal-government officials in charge of infrastructure policy want to invest in that infrastructure often reflects their ideological viewpoints. Freemark, Hudson, and Zhao (2020) show that municipal staff from cities whose residents have more liberal ideological views are far more likely to say they support "increasing street space for pedestrians" and "transforming car lanes for pedestrians and cyclists." Similarly, Klein et al. (2021) show that self-described liberals are far more likely than conservatives to believe that "using money from gas taxes to pay for walking, biking, and transit is fair" and that "drivers should share some space with people walking, biking, and taking transit." And Freemark (2021) shows that states with more liberal residents are far more likely to increase investment in non-automobile transportation options.

We therefore cannot easily separate the goal of improved cycling infrastructure from ideological points of view held by political officials and the people they represent. PfB and Wend staff developing the Final Mile program recognized that mayors themselves had to be ideologically committed to improving cycling in their communities *before* any progress was made on improvements. This awareness informed their choice to negotiate with mayor's offices as a first step.

Though local governments have the technical means to leverage their jurisdictional power to improve cycling infrastructure, cities vary in their ability to execute on this promise—even if there is

political and bureaucratic support in favor of change. Examples from the Final Mile–funded cities demonstrate this variation on four counts, related to governance systems, a multiplicity of political actors, demographics, and prior political choices.

First, because of the position of city governments within a multilevel governmental system, they do not control *all* the right-of-way in their communities. Providence, for example, has faced challenges from state officials who do not share the city's enthusiasm for protected cycling infrastructure. The city's Great Streets plan proposed improvements on a preexisting bike path along Broadway heading west from downtown. But a portion of this route, including the section that crosses over I-95, is a state-controlled road (it is part of US 1).[20] As a result, Providence officials told us they had trouble convincing the state government to allow for separated bike lanes over this corridor, even though the city was willing to pay the investment costs.

Second, cities are not monoliths. By this we mean that cities do not act on behalf of one individual, but rather a group of interested parties. All the Final Mile cities have a mayor elected at large. In the initial development of the Final Mile program, PfB and Wend staff met with mayors and mayoral staff to seal deals. But US cities also have city councils serving as legislative bodies that must approve long-term plans and local ordinances. In Austin, Pittsburgh, and Providence, councilors are elected by geographic district, whereas in Denver and New Orleans, several of the councilors represent the city at large. In some cases, district-based councilors assert their "prerogative" over decisions about public policy within their districts. This influence means that councilors sometimes reflect more locally specific concerns (such as the concerns of an individual business) than an at-large councilor or mayor would. Austin also has a city manager who takes on the considerable work of day-to-day operations in the municipality. Last, each city has bureaucratic staff who oversee maintenance and construction on the street and transportation policy. The implementation of cycling improvements requires coordination among all these individuals.

Nor is local debate isolated within the city government. In each Final Mile city, nonprofit organizations help organize the public on behalf of better cycling infrastructure. These organizations inform the debate about what types of investments to fund. One reason why staff from PfB and Wend told us that they emphasized grants to nonprofits, and not to the cities themselves, was that they believed it would help better distribute power among individuals involved in the planning and development process.

Third, the unique distribution of people in each community has considerable influence on how cycling infrastructure is perceived. Partly because of the difficulties of biking—such as a lack of safety

and inconvenience of bike-supporting amenities (like bike racks or bike rooms at employment centers)—it has often been described as a wealthy white man's recreational tool. Indeed, white people are somewhat overrepresented, and men are very overrepresented, in overall cycling trips.[21] As noted in the introduction, this distribution is likely to become more equitable over time with better infrastructure, but in the meantime, residents of communities of color and people with low incomes sometimes feel that investments in cycling neglect their most important needs. Interviewees in Denver told us, for example, that residents in neighborhoods where Latinx people predominate worried that cycling infrastructure would encourage gentrification, which made new lanes tough to implement there.

Last, communities have different levels of municipal capacity to implement projects. These differences in capacity are related to local wealth and past priorities. In 2017, for example, the city of Providence spent a total of only $52 per capita on transportation, compared to $336, $1,256, $741, and $351 in Austin, Denver, New Orleans, and Pittsburgh, respectively.[22] This partly reflects the fact that the state of Rhode Island may take on more of the transportation infrastructure in Providence than in the other cities, and that Providence is a much smaller community than the others in this group (table 2), but also may reflect local political choices. These choices have long-term consequences, as they affect whether the city can commit the resources needed to ensure staff to manage the rollout of improved cycling infrastructure.

Public Interest in Multimodal Transportation Is Broad

Over the last century, American cities have underinvested in streets designed for the safe movement of cyclists. Local, state, and federal departments of transportation have prioritized the movement of personal automobiles and trucks, to the detriment of those who choose to bike.[23] Nevertheless, cycling has become increasingly popular in many American communities of late, because of both public investment and changing popular norms.[24] The pandemic period in particular encouraged many people to use cycling as an opportunity to get exercise outside the house—a change made possible to some degree because fewer cars on the street meant safer cycling. The Final Mile program, then, was organized at a fortuitous moment: it was supporting a mode of transportation that is attracting increased interest. Funded cities were able to ride the wave in favor of improved infrastructure.

As noted in the previous section, in US cities there is frequently the perception—and sometimes the lived reality—that cycling infrastructure is designed to benefit the needs of wealthy, white, and male individuals over others'. But support for cycling infrastructure has broadened. Organizations such

as Major Taylor cycling clubs have sprung up in cities nationwide with the intention of encouraging more Black people to get onto bikes.[25] Cycling also can be an opportunity to promote affordable, equitable mobility for people from all backgrounds, if the right conditions are in place.[26]

Through several contractors, PfB conducted statistically representative surveys of residents in each city to assess resident feelings about current biking conditions and interest in cycling investment. Results make clear that support for better biking is widespread in a diversity of communities. Responses to several of the questions in four of the cities are documented in table 3.

At least three-quarters of respondents in each of the cities agreed that biking is good for the community, suggesting general support for more investment. And, indeed, respondents in New Orleans were much more likely to believe that their local governments were not spending enough on bike lanes (42 percent) than to think that the city was spending too much (18 percent). But most residents in each of the cities believed that biking was not safe enough for people in their respective communities; 43 percent or fewer of respondents in all four cities agreed that biking is safe for all people.

TABLE 3

Widespread Support for Cycling Investment across the Final Mile Cities

Share agreeing or strongly agreeing

	Austin	Denver	New Orleans	Providence
Biking is good for the community	75%	82%	87%	84%
Of the money that the City spends on transportation, are we spending too much vs. not enough on bicycle lanes?*	NA	NA	18% vs. 42%	NA
Biking is safe for all people	32%	40%	39%	43%
Separating bikes and scooters from cars makes the streets safer for drivers*	80%	NA	76%	NA
More likely to ride if bike lanes had separated barriers	56%	47%	58%	50%

Source: Surveys of residents; results provided by PeopleForBikes. Austin survey in October–November 2018 or July 2020 (*); Denver survey in July 2019; New Orleans survey in November 2018 or spring 2019 (*); Providence survey in April 2019.
Note: NA = no answer.

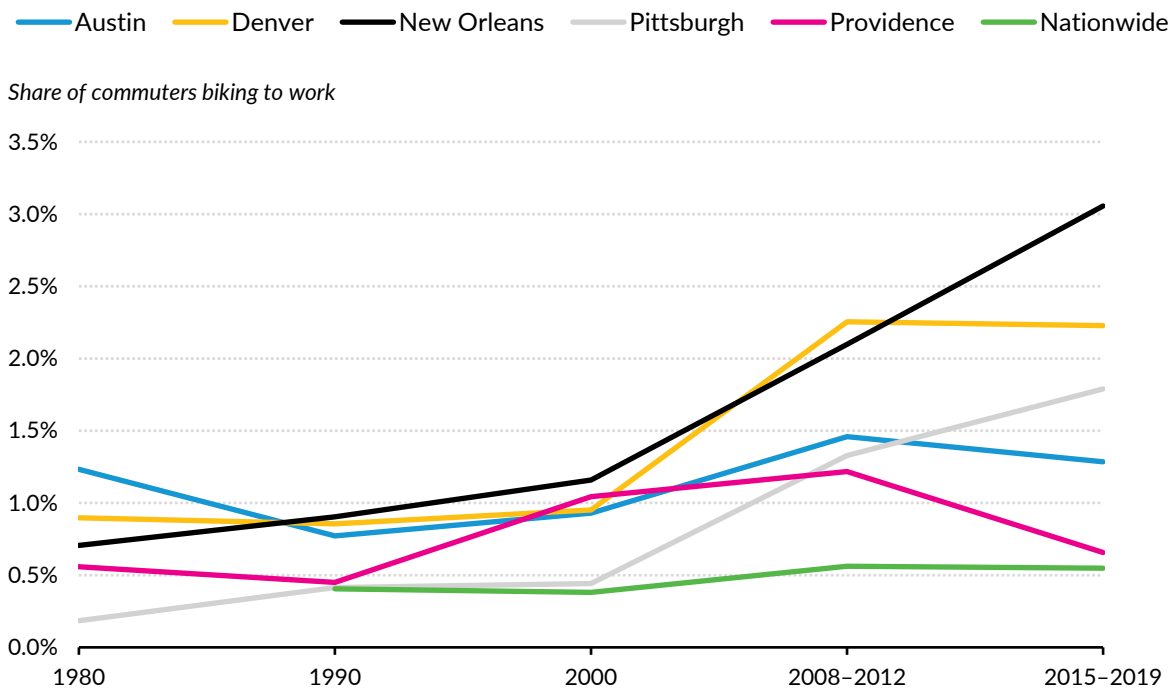
The results in table 3, however, also point to support for alternative approaches and the benefits of investments in high-quality networks. In Austin and New Orleans, more than three-quarters of respondents agreed that separating bikes and scooters from cars was likely to result in safer streets for drivers. And about half of respondents in all cities agreed that they would be more likely to bike if the bike lanes were separated. These preferences indicate that residents supported the investment programs being pursued by the Final Mile cities; the results were reflected in the views of respondents who were low income, nonwhite, and female, as well.

The Potential for Rapid Increases in Bicycle Use

Since 1990, the share of US commuters biking to work nationwide has barely budged; only about half a percent of all workers commute by cycling (figure 3). The 2015–2019 American Community Survey showed that only about 840,000 US workers commute by bike—compared to more than 150 million commuters overall. Cycling is more common in the Final Mile cities; Denver and New Orleans lead the pack with more than 2 percent of all commuters cycling. Since 1980, bicycling mode share has increased in each of the cities except for Providence, with Denver, New Orleans, and Pittsburgh seeing particularly significant boosts (changes recorded in figure 3 occurred before the onset of the Final Mile program). Nonetheless, cycling remains far less popular in every city than driving or taking transit.

FIGURE 3

Cycling Commuting Has Increased Recently in Austin, Denver, New Orleans, and Pittsburgh



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Source: US Census 1980, 1990, 2000; American Community Surveys 2008–2012, 2015–2019.

These trends helped motivate the Final Mile program, one of whose goals was to double travel by bike in the communities where investments were made. In theory, by investing dramatically in a safe, secure cycling network, many more people would shift to biking. Evidence from US cities suggests that

such momentum is possible over the long run. Between 1980 and 2015–2019, for example, the share of people cycling to work increased from 1 percent to 6 percent in Portland, Oregon. As of the latter date, there were more cycling commuters in Portland than in Austin, Denver, and New Orleans combined.[27] That city and its respective state government had made considerable investments in improved cycling infrastructure, showing how public investments can make a difference.

Those trends took decades to achieve, but evidence from cities elsewhere in the world suggests that major investments can accelerate change. In Paris, France, at the onset of the COVID-19 pandemic, the city invested in a network of 37 miles of secure cycle tracks on some of the city's most prominent streets, removing lanes from car access. These investments dramatically increased the availability of secure cycling infrastructure.[28] The public's response was near-instantaneous: bike traffic increased by more than 50 percent compared to the year before, with the ramp-up particularly steep on the most improved streets.[29] Admittedly, these changes occurred during a health emergency, which may have produced a unique environment, but they are still telling of the potential for infrastructure to dramatically alter how people move around.

A Multipronged Political Strategy Builds Support for Infrastructure

The Final Mile program emphasized direct engagement with political officials as key to encouraging changes in the local transportation system. This political strategy held that a stated commitment from political leaders, combined with continuous maintenance of accountability mechanisms, would ensure that plans for improved cycling infrastructure manifested. This approach was different from other programs that emphasized building knowledge about best practices or generating ground-up advocacy.

In this section, we leverage the interviews we conducted with local officials and nonprofit leaders. These findings help inform our understanding of how to mount a successful campaign in favor of more sustainable transportation infrastructure. We make the following key arguments:

- Political leaders in Final Mile cities were already interested in supporting improved cycling infrastructure. But the promise of additional funding for communications and engineering helped local leaders "get to yes" and commit to an ambitious cycling improvement program.
- An emphasis on regular communication with PfB, Wend, and other members of the Final Mile team helped keep bike infrastructure on city staff's front burner. Staff who might otherwise be distracted by emergencies were able to keep their minds on designing and building the cycle programs.
- Final Mile's support for engineering assistance in several of the funded cities was welcome in communities with limited administrative capacity. This assistance helped speed the completion of projects that otherwise might have taken longer to get to construction.
- Despite efforts to encourage frequent communication through repeated meetings and a project manager, relationships between advocates and city staff continue to be occasionally hostile. City staff are hesitant to devolve decisionmaking authority into the hands of nonprofit organizers, and nonprofit organizers are hesitant to trust city staff to make decisions promoting cycling infrastructure.
- Although political leadership was essential in building support for municipal investments, the long-term success of this program may depend on future leaders making similar commitments. There is no guarantee of such commitments, which potentially imperils the completion of cities' cycling plans.

The Promise of Funds Attracts Initial Interest and Commitment from Local Political Leaders

Many municipalities throughout the United States are considering how to expand cycling infrastructure. They are joined by a large cohort of local and national organizations fighting for these improvements. But these efforts have only been partly successful; no US cities have networks rivaling the scope and extent of cycling systems common in communities where cycling is more popular, such as in the Netherlands. To catch up, the Final Mile program was intended as an accelerant of local plans, first by acting as a motivator for political action. We find that, in the funded cities, this approach was effective in generating new funds for bike infrastructure in the context of local support and growing bureaucratic capacity.

The strategy undertaken by staff at PfB and Wend was to conduct a series of negotiation sessions with officials in mayor's offices, with the ultimate goal of convincing the mayor to agree to publicly endorse a mileage goal to grow the secure bike network. This approach helped transform mayors—previously somewhat interested in biking but not necessarily committed to it—into "cheerleaders" or "champions." One stakeholder in Providence, for example, noted that the mayor led in promoting bike infrastructure and getting the program off the ground. Noted an advocate in New Orleans, "I'd call [the bike plan] the mayor's vision."

Having mayoral leadership was essential to ensuring the project could advance, said a former staffer at the Denver Department of Transportation. A Denver councilor told us that though "support in Denver [for bike infrastructure] generally has been high since I've been here . . . [there was not] a cohesive, organized group" in favor of it. The mayor's leadership, supported by the Final Mile program, helped create a pathway to generating that organization.

One primary approach by which the program accelerated local plans was through the dedication of specific budget line items for cycling improvements. Austin and Denver officials worked to develop new local resources exclusively for the purpose through tax and bond ballot measures. Particularly in Austin, the Final Mile project manager played a decisive role in developing and campaigning for the 2020 Proposition B, which dedicated more than $100 million for cycling infrastructure. An interviewee working on the Proposition B campaign leveraged positive polling (e.g., table 3) to emphasize the high level of public support for investments. Partly because of this evidence, the city council agreed to pass a resolution in March 2019 supporting the plan more than a year before it went on the ballot.

In Denver, a council member told us that, here too, official leadership was key to passing such tax improvements. “The mayor holds all the cards in Denver,” they noted. “If the mayor is on board, it’s easy.” In New Orleans, Pittsburgh, and Providence, the negotiations among their respective mayor’s offices, PfB, and Wend produced agreements to dedicate existing—but as of then unallocated—capital funds for bikeway implementation.

A secondary approach was plan setting, which occurred both through the development of long-term citywide plans and short-term action plans. In Pittsburgh, advocates and city staffers agreed that Final Mile provided the “impetus” to complete the city’s strategic bikeway plan, which a city official said was “10 years overdue.” In Providence, the Great Streets master plan, developed in coordination with Final Mile support, helped reinforce the importance of developing the bike program as a *network*, not just a series of individual projects.

In each case, the Final Mile program was aided by the rollout of new, dedicated city transportation departments, which extended beyond the roads-focused mentality of public works departments common in many US cities. New transportation departments were motivated to promote multimodal solutions to mobility problems—and this aided cities in achieving their Final Mile goals. In both New Orleans and Pittsburgh, city mayors endorsed the new transportation departments. This institutional change could, in theory, serve as a mechanism to encourage long-term commitment to multimodal projects, though so far there is inadequate evidence to demonstrate that this commitment has been realized.

Regular Communication and Threats Keep Leadership in Line as an Accountability Mechanism

Beyond setting a goal for infrastructure construction, the Final Mile program was designed to encourage long-term commitment to achieving that goal. After working with local officials to establish planned, safe cycling-route mileage, PfB and Wend leadership identified a local project manager, funded nonprofit organizations, and aided the frequent convening of local groups, all intended to serve as accountability mechanisms for promoting positive outcomes. (They also funded new communications programs, to which we return.) Interviews we conducted show clearly that these approaches effectively kept the pressure on local governments—and helped ensure project goals were achieved.

In each Final Mile city, PfB and Wend staff used preliminary surveys to establish broad-scale support for investment in cycling infrastructure as a first step. They pointed to broad agreement that cycling was good for the community (table 3), then shared that information with elected officials and other local stakeholders. These polls were distributed again in later years of the program, providing updated information about the public's positive views on cycling. This emphasis on the public's support helped local officials justify their own support for the program. Interviewees representing nonprofits emphasized the poll data; they depicted "the details of the public conversation shift," said an organizer from New Orleans.

Noted one Denver council member who we interviewed, "We have polling to show support for biking is high enough to suppress attacks" from the small number of people against investment, who they characterized as "complaining." "I think the sentiment is to become more and more pro-bike," they said. And countering these attacks was essential in maintaining a long-term focus on getting improvements funded and built. One Denver organizer told us that though "polling shows that people really are in favor of reducing parking and improving the bike network," they had experienced public meetings where residents had screamed their opposition to any changes to the streetscape.

The Final Mile's use of local project managers also helped focus a direction for the program, partly by connecting the goals established at the national level with realities of implementation on the ground. PfB oversight of the managers contributed to this approach. One manager told us that "PfB is committed to holding [local leaders] accountable." Another emphasized that, as they were beginning their work, "there was a very strong push to hold me accountable on a weekly basis"—particularly in their task of holding conversations with city stakeholders.

Ensuring that project managers were effective was an important program tool because, when push came to shove, PfB and Wend wanted to be able to use the tools in their arsenal to encourage cities to make progress. Staff at the two organizations told us that several of the case-study city governments repeatedly attempted to reduce their mileage goals during program rollout in reaction to difficulties they experienced. But PfB and Wend emphasized, by communicating through local project managers and directly with city staff, that if such a change were made, they would remove their funding for local nonprofits, advertising, and engineering. This kept local politicians and city employees on track.

Placing pressure on local staff was effective, for better or worse. Many city officials held that it helped keep them attentive to the mileage goals in the context of multiple needs expressed from above. In Pittsburgh, one person working on the program said, "I think having the directive from the Final Mile has cleared the plate for city staff." A consultant there told us, "Most humans want to make

their deadlines. . . . All these fake deadlines [the Final Mile goals] give the city staff a reason to focus and concentrate on the project."

Others emphasized that they felt overwhelmed by this approach, arguing that the initial goals were unreasonable. A Pittsburgh official said, "There should have been more realistic check-ins about what was feasible," and a Denver planner emphasized that "this job has been the hardest work I've even done . . . the workload was truly insane." One staffer told us that they had been overwhelmed by the challenges of building out mileage as planned, and that they would have appreciated "greater flexibility," especially given the pandemic.

Providing Engineering Support Fills a Big Gap

Though PfB and Wend did not provide direct aid to cities to fund infrastructure construction, they did offer engineering support—such as services for network planning and street design—through the Toole Design Group. Toole filled a capacity gap for local officials, especially for the relatively less-funded local governments in New Orleans, Pittsburgh, and Providence. These external staff did not develop their own plans but rather helped municipalities achieve the goals they developed internally. Austin and Denver, benefiting from considerable local funding, were better able to generate the resources to expand staffing.

In Providence, a city staffer emphasized that this support "made it possible to accelerate improvements in a way that would not have otherwise happened." In Pittsburgh, an organizer argued that the "city's capacity to do design work is limited," and that the program's resources thus were essential. In New Orleans, where one nonprofit leader said the city "has always been somewhat underfunded," staff at Toole noted that they filled a staff capacity gap. The city simply did not have the adequate staffing to manage task orders, projects, and assignments, so Toole was an essential complement.

Though Toole's involvement did not displace local decisionmaking, it did serve as a mechanism to better conceptualize bike infrastructure as a network, rather than a corridor-by-corridor program, according to interviewees. PfB staff said it altered New Orleans's entire approach to infrastructure planning, as Toole conducted a series of network analyses, foregrounding the principles of equity, safety, and timeliness. Noted an advocate in Pittsburgh, "One major change factor has been a major interest finally among stakeholders to see bike infrastructure as a network, not as just a series of links." This built on what had initially been a "disjointed" system, according to a Toole employee. Similarly, in

Austin, an individual working on the Final Mile program said, “When I started, I would characterize it as a mish-mash, between good infrastructure, but not necessarily connected.” This impacted how people interacted with the bike system itself. “In terms of going from one side of town to another,” they noted, “you were going from fearless to not caring,” meaning the system felt alternately dangerous and comfortable to riders.

Assembling Long-Term Links between Advocates and City Staff Is a Challenge

One of the major goals of the Final Mile program was to encourage increased communication between city staff and cycling advocates. In theory, this improved dialogue would enable the groups to collaborate in addressing local resistance to investment; expand the ability of nonprofits to coordinate “showing up” in favor of projects; and improve the quality of projects themselves by focusing on needs identified by community members. We find that Final Mile increased discussion between stakeholders involved with cycling infrastructure in each of the cities. In many cases, this discussion resulted in better coordination and thus improved efforts to support improvements. But tension between public and nonprofit representatives did not fully attenuate. In fact, in several cases, city staff told us that they rarely incorporated feedback from advocates—and advocates struck out on their own, playing an “outside game” with their relationships to the city, despite conversations between them and staff.

For advocates in Pittsburgh, the Final Mile program was particularly useful in improving dialogue. An advocate told us that “meetings went from haphazard to very frequent,” in the context of “relationships with city hall staff improving considerably.” Another nonprofit leader, this time in Denver, told us, “without PeopleForBikes, [the local nonprofit] would have taken somewhat of a different approach.” They argued that the nonprofit became something of a cheerleader for the city, rather than applying more outside pressure on the mayor, as had previously been the case.

Funding local project managers (instead of making grants to cities directly) kept such relationships on track. A project manager working in one of the Final Mile cities said that they were working to “bridge between transportation staff and the groups that are advocating for, and pushing the city to work with them.” This project management meant frequent meetings and also staying in touch with stakeholders in the public and nonprofit spheres through phone calls and texts, which ensured that cycling improvements were never placed on the back burner.

Each city's staff confirmed that their communication with nonprofits expanded due to Final Mile. Nonprofit leaders agreed that this helped encourage the rapid rollout of infrastructure; one emphasized the "strong partnership" that had been constructed. Some project managers demonstrated that their role went beyond just coordinating meetings. In one city, that person's close connection with city staff and elected officials allowed the manager to continue pushing for expanded funding for cycling infrastructure. In this way, the project manager became an advocate assisting the nonprofits to achieve their goals.

The structure of the Final Mile program, however, limited its ability to ensure such positive communication. One key problem was that some city officials—though only a minority—believed that the program had provided considerable resources to nonprofits but inadequate aid to the cities themselves. (In some cases, city officials were paid much less than the project manager supported directly by Final Mile.) One former city employee said that advocacy groups requested frequent meetings but failed to "understan[d] the barriers the city faces," "pushed for things that wouldn't work," and "continuously complained about the city to PfB." This "made the city feel uncomfortable in the partnership dynamics." At the same time, while advocates were receiving assistance, city staff were put on the hook for meeting mileage goals. This person felt that expectations of those involved in the program were not as clearly established from the start as needed. A city staff member in another city said that the program was "definitely a lot of coordination that feels like it doesn't translate to outcomes."

In several cases, those involved also questioned the way the program was organized, particularly the role of advocacy in a program designed to encourage municipal action. One nonprofit leader in Denver said that the project manager "adds an additional layer of bureaucracy" and was less useful in assisting their work than had been their direct contact with national staff at PfB. A city staffer in Pittsburgh argued that the project manager "made very little progress" in achieving the goals of the program, despite the funding. Another staffer suggested that a program of this sort should be run out of the city government, not by a third party.

Last, some city officials dismissed nonprofit partners as needlessly negative. One staffer in Denver said they did not believe partnerships had grown at all with nonprofit organizations. A Toole employee working in one city said that "the general sentiment from the city is that advocates don't say thank you enough when we do things they ask us to do." This dismissal was felt by those involved in the program. In Denver, an advocate said city officials downplayed nonprofits as "being paid by PfB to be cheerleaders." As a result, the views of nonprofit staff—despite the frequent meetings—were sometimes ignored.

Political Commitment May Not Span Multiple Leaders

The Final Mile program's decisively political approach to making change depended on local leadership to be effective. Mayoral leadership was key in committing local governments to achieving positive outcomes, but mayors themselves did not always commit deeply to implementing the program. This dependence—expressed most directly in terms of mayoral support for achieving cycling-infrastructure mileage goals—nevertheless raises questions about the long-term viability of the program. Meanwhile, city councilors in several cities were not universally supportive of the program and more likely to endorse anti-investment views. As a result, it is not clear whether Final Mile will continue to attract interest in the years ahead.

PfB and Wend attempted to build broader and longer-lasting public support for the work on cycling infrastructure in several ways, but these were not always successful. For several of the funded cities, the Final Mile program funded trips overseas. Local officials, like a councilor in Denver, agreed that the cycling infrastructure they saw was inspirational. "In Barcelona, I noticed—even when it was just paint—I always knew where to go," the councilor told us. An advocate in Denver said that such trips increased support, but that "there's still some hesitation" from political officials that may ultimately make it difficult to get projects done over the long term.

Even in the short term, some advocates argued to us that mayoral leadership was too limited other than in terms of a commitment to building the agreed-upon mileage. In Providence, a city official told us that the mayor, while "play[ing] a positive and leading role in promoting bike infrastructure," nevertheless had "not been hands on" in the process. A nonprofit leader in Pittsburgh said they "wished there was more buy-in from the mayor's office." Others in several cities told us that because the day-to-day work was implemented by the local departments of transportation, the mayor's office had only limited commitment. The question for them was whether the involvement of that local bureaucracy would ultimately result in steadfast commitment to project development.

Moreover, the individualized focus on the mayor had its limitations. "We knew that the [bike improvements] would only happen if the mayor I supported won," said an advocate in New Orleans. An engineer working on the project in Providence emphasized that the mayor's status as a bike rider was one reason for the program's success—but also that this status meant that some interpreted the city's action as "a pet project for politicians." "It's both an asset and a liability," they argued. Indeed, if supportive mayors are not reelected, cycling investment may lose momentum.

Whether or not local staff were committed to the project, in every city elected city councilors served as intermediaries between concerned residents and project implementation. In several cases,

that meant councilors came out against interventions that would, for example, require parking space removal—heavily contested by local residents. A planner in Denver told us that the "city council doesn't seem bound to projects and doesn't feel obligated to have to address issues." The result, they said, is that "I feel like I'm caught in this web of trying to juggle a lot of responsibilities and managing all of these different personalities." In Providence, a planner we interviewed said the council acted primarily as a barrier to positive outcomes, with a minority on the body specifically opposed to cycling investments. Given these conditions, it is not clear whether the Final Mile program will have long-term support or falter when city leadership changes.

Communications Strategies Have Had Mixed Effectiveness

One of the core elements of the Final Mile program was an effort to use communication tools to share information about the benefits of investment in cycling infrastructure. PfB and Wend coordinated with national advertisers and local stakeholders to use social media, billboards, and earned media—and even special initiatives like branded pizza boxes—to generate excitement and interest. Some of the media were targeted to specific neighborhoods expected to be transformed. This approach was intended to leverage broad public sentiment in favor of bike infrastructure, help educate drivers about why bike programs would help them too, and further encourage local politicians to solidify their support for achieving Final Mile's mileage goals.

Again taking advantage of the interviews we conducted with stakeholders, in this section we detail findings related to the communications campaign. The following are our key conclusions:

- The campaigns funded by the Final Mile program successfully exposed a large share of each community's population to information related to bike infrastructure and its benefits—even for people like drivers who might otherwise not see the use of such projects. That said, stakeholders in several of the communities felt that the nationally designed advertising campaigns may have been less effective than locally generated approaches.
- The advertising campaigns were effective in convincing officials that there was public conversation at play on bike infrastructure. This helped motivate continued investment and aided the passage of major funding referenda in Austin and Denver.
- In some cases, funded advertisements targeted specific neighborhoods where construction on bikeways was expected to occur. Although theoretically useful in that the campaign helped people in these areas better understand what construction was occurring, targeting advertisements at the same time as construction was difficult to achieve. Advocates saw door-to-door efforts, which were largely stopped because of the COVID-19 pandemic, as more effective.
- Despite broad outreach efforts to promote better cycling infrastructure, city staff continued to worry about the dominance of people opposed to investment at community meetings and who expressed themselves to local officials. The advertising campaigns do not appear to have resolved that concern, which continues to stymie effective project rollout.

- While the Final Mile's campaigns were designed to promote the interests of investment in cycling infrastructure from the perspective of both the public and nonprofit sectors, many advocates continued to see value in operating independently to run their own outreach, to some degree because they hoped to generate a multimodal approach to investing in transportation, not just one focused on cycling. In some cases, this meant playing an "inside–outside" game with the goal of continuing to pressure local leaders while also working with them at key points.

Mass-Media Campaigns Encourage Public Knowledge

One of the key elements of the Final Mile program was supporting media campaigns in each funded city. These campaigns were developed by an advertising firm, GSD&M, and modified slightly to reflect each market. They followed a messaging framework developed by the Neimand Collaborative, a marketing agency, under a contract with PfB and Wend. Neimand tested and refined the frames and language used in each community through focus groups and surveys, though the final products were similar across the five cities, partly because GSD&M provided relatively standardized graphics. Ads were distributed on billboards and wraps around buses, in print, and on social media platforms. Some distribution was citywide, while part of it (especially the social media element) was localized in areas expected to be experiencing construction (see next section). These campaigns appear to have increased public knowledge of the benefits of cycling projects, and they certainly reached large audiences.

Staff at PfB, Wend, and GSD&M told us in interviews that the goal of the communication campaign was to improve citywide perceptions of cycling investments, particularly among drivers. Said a GSD&M employee, "Everyone buys that there is a benefit to multimodal infrastructure, but they don't think that the benefit is worth the cost." Ads would help address that and be "layered on top of the city's traditional communications process," according to an advocate in Austin. This, they said, would encourage people to visit advocacy websites, learn about city-sponsored engagement events, get media coverage, and—perhaps most importantly in terms of affirming political support for bike infrastructure—get "other voices than just cranky neighbors" into the public discourse.

Noted a project manager in one city, advertisements would "brin[g] campaign communication techniques to this public policy issue." An advocate from Denver emphasized that the current approach of public processes and related news stories increased the power of "a small number of influential individuals," as well as "business owners and neighborhood associations" who opposed

cycling projects, despite the fact that the majority of people supported cycling investments. The Final Mile program, they believed, would change the dominant public dialogue through advertising.

The media campaign emphasized diverse, safe, and multimodal street use with protected cycling lanes, demonstrated in figure 4. Drawings showed people of all ages biking and walking, as well as safe conditions for motorists. PfB and Wend interviewees made clear that they wanted to make drivers, who constitute the majority of the population in all Final Mile cities, feel like the street improvements would work for them. One GSD&M employee told us that "the target audience for most of this work was drivers." They found that driver-focused billboards would be a particularly useful way to get in their heads. Advertisements emphasized the concept that separating space on the street for different modes would encourage better conditions for all: a piece of the road for everyone would produce peace on the road.

FIGURE 4

Example of Campaign Ad Distributed in Denver

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Source: PfB and GSD&M, Denver, Phase 1, Approved Campaign Concepts, June 20, 2020.
Note: A video version of this campaign is available on YouTube: https://www.youtube.com/watch?v=_ZBySxXA1Iw.

In New Orleans, advertisements emphasized that city street improvements were designed "so everyone will have more control and more choices with a lot less frustration." Language approved for

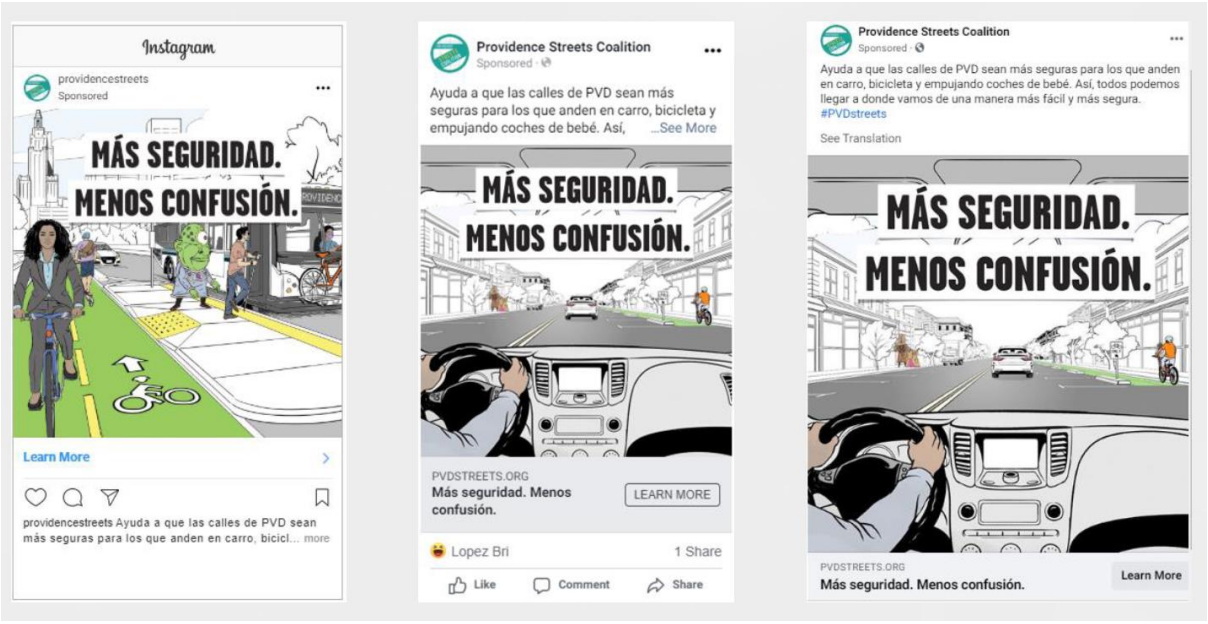
use in print in Denver typifies this friendly, optimistic approach to supporting investment in street infrastructure:

> Today in Denver, there are more people than ever driving cars, taking buses and riding bikes, walking to parks, going jogging, and pushing strollers. So it's important we all support the new protected lanes. They're making the Mile High City safer, smarter and more connected. By sharing just a little more of the street, we gain a whole lot more in safety. Plus, we get more clarity about the rules of the road, more equality in transportation and more access to the Denver we love.

Advertisement was particularly widespread on social media. The Final Mile program funded advertisements on Facebook and Instagram, and videos on YouTube, Hulu, and other outlets. Some of these advertisements were in Spanish to ensure that they reflected that city as a whole (figure 5). In some cases, these advertisements targeted people specifically logging in from zip codes where construction on cycling infrastructure was due to occur.

FIGURE 5

Examples of Spanish-Language Digital Advertisements Distributed in Providence



URBAN INSTITUTE

Source: PfB and GSD&M, PVD Digital Screenshots, Campaign Launch, Phase 1, June 22, 2020.
Note: These ads were distributed via Instagram and Facebook.

By the end of the third quarter of 2021, according to a PfB analysis, the media campaigns had been successful in reaching millions of eyes over just a few years (table 4). In each city, video views and other paid social media impressions vastly outnumbered the local population, indicating the

campaign had been effective, at minimum, in sharing the message. Overall, these advertisements cost PfB and Wend about $5 million.

TABLE 4

Widespread Support for Cycling Investment across the Final Mile Cities

	Austin	Denver	New Orleans	Pittsburgh	Providence
Video views	16.8 m	13.7 m	8.3 m	8.6 m	6.4 m
Video completion rate	62.7%	67.6%	58.1%	70.4%	67.4%
Paid social media impressions	28.8 m	11.1 m	9.5 m	7.9 m	6.4 m

Source: PfB, The Final Mile Q3 2021 Progress Report.

According to some interviewees, the advertisements had significant impact on the public conversation. A city staffer in Denver told us they thought it had been a "successful ad campaign" that reflected the "partnership with biking advocacy groups." An advocate in Pittsburgh emphasized that the effort had "helped people understand the nitty-gritty of the project designs," partly because the images distributed showed how space would be divided on the street. Advocates appreciated that the campaigns pointed users to the nonprofit organizations' websites, and one organizer told us that the advertisements had increased the size of their mailing list.

Some interviewees emphasized that the public campaigns were making inroads among political officials, a key element of the program's goal of acting as an accountability mechanism for continuing investments in cycling infrastructure even in the face of neighborhood opposition. Several interviewees told us that they heard anecdotally that people they knew—including political officials and residents—had seen the advertisements. This indicates that the program was generating a "buzz" in the community. A staffer for the city of Austin told us, "I know people are noticing it," and commented that more people were talking about biking improvements than before.

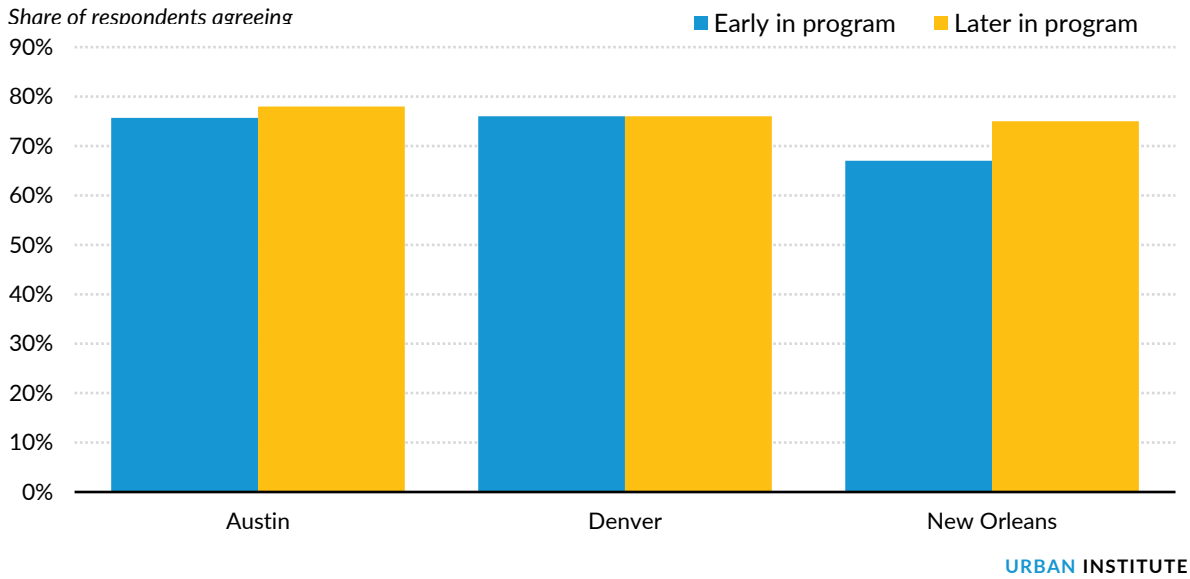
One way to measure the effectiveness of the Final Mile communications campaign is to explore how it influenced public opinions of investment in cycling infrastructure. The statistically representative surveys conducted in each of the cities, in some cases with repeat questions at the very beginning of the program and then later therein, provide useful insight. Note that the timing of the repeated surveys was pre-pandemic and then during the pandemic; this may have influenced outcomes.

In figure 6, we document changes in resident views about whether they agree that "we must spend more on alternatives to cars because we can never build enough roads to solve our traffic problems." These polling results indicate no or modest impacts of the program on the public's views. In

Denver, there was no change in respondent views on this subject between 2020 and 2021, when polls were taken. But in both Austin and New Orleans, respondents—already supportive of funding non-automotive infrastructure—became more so between 2019 and 2020, when their respective polls were taken. In New Orleans particularly, the share of respondents agreeing with the need to invest in car alternatives increased from 67 percent in 2019 to 75 percent in 2020.

FIGURE 6

Polling Indicates Growing Support for Funding Alternatives to Cars in Austin and New Orleans



Source: PfB-commissioned surveys of residents in Austin, Denver, and New Orleans. Surveys were taken February 27–March 6, 2019, and July 19–23, 2020, in Austin; January 23–27, 2020, and February 8–15, 2021, in Denver; and April 3–13, 2019 and August 12–16, 2020, in New Orleans.
Notes: Respondents were asked whether they agree or strongly agree that "we must spend more on alternatives to cars because we can never build enough roads to solve our traffic problems." Margins of error were about ±4 percent in each case.

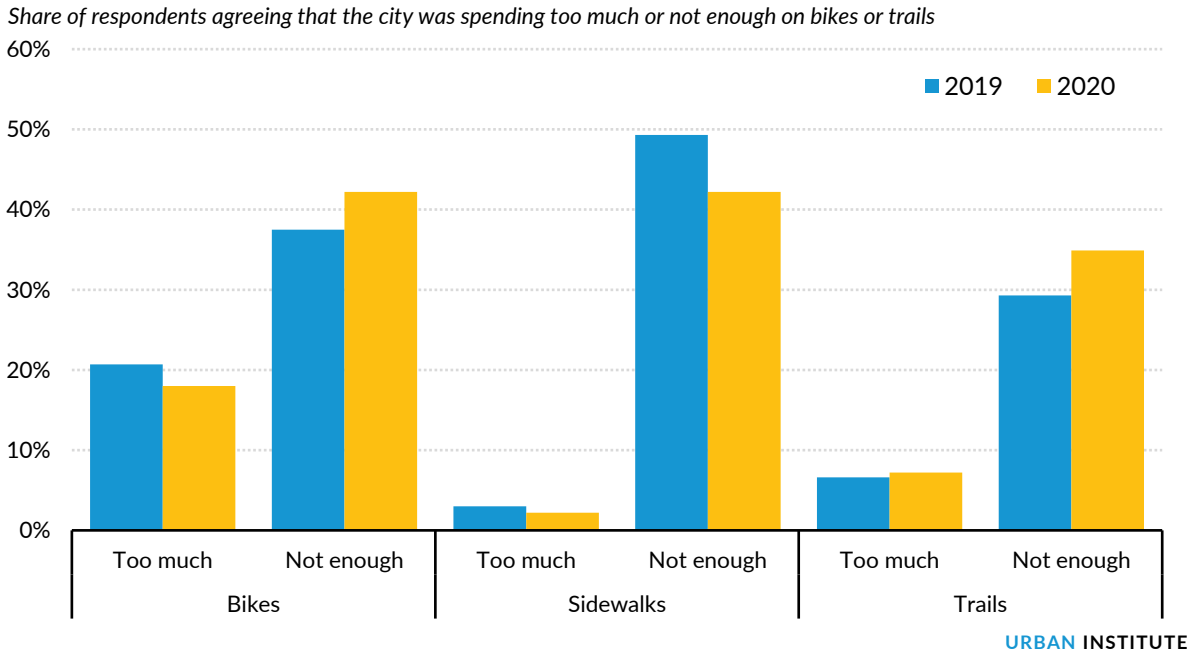
Despite some success in outreach, a subset of interviewees raised concerns that the campaigns were not localized enough in character. The advertisements developed by GSD&M (figures 4 and 5) were conceived similarly in each of the Final Mile cities, with some minor variations, such as in terms of skylines, building types, and slogans. Though a GSD&M employee maintained that this helped make the ads "regionally specific," one city staff member in Denver complained in an interview that the "graphics are identical to [those] in other cities." They argued that a locally produced YouTube video, made without national input, had had more impact in changing public perceptions. An advocate there said the "jury's still out" in terms of the effectiveness of the communications campaign. A city official in Providence agreed, arguing that PfB and Wend had "preconceived notions about what they wanted to be doing," and thus had little interest in creating a campaign unique to that city.

Despite these critiques, there was a strong sense in Austin that the communications campaign had been effective. This was made most manifest in the link between the Final Mile campaign and the 2020 vote on Proposition B, which provided $460 million for transportation infrastructure—a large share of which would be distributed to bike and sidewalk infrastructure. In that case, the Final Mile's paid media were combined with significant earned media coverage. Television and print media covered the campaign and helped raise the public discussion of the importance of safer streets.

Survey results from Austin indicate that the public perceptions of cycling infrastructure improved after the program began (figure 7). Between 2019 and 2020, a growing share of Austinites agreed that the city was not spending enough on bikes and trails, increasing for each mode by about 5 percentage points. The share that believed the city was spending too much on bikes declined and the share believing the same about trails remained roughly flat. These data help explain why more than two-thirds of city voters agreed to pass Proposition B. That said, differences in figure 7 are within or close to margins of error, and we cannot exclude the possibility that other explanations, such as media stories related to the referendum, also played a role in encouraging changing mentalities.

FIGURE 7

Over the Course of the Final Mile Program, Austin Residents Became More Supportive of Increasing Spending on Bike and Trail Infrastructure



Source: PfB-commissioned surveys of residents. Survey was taken February 27–March 6, 2019, and July 19–23, 2020, in Austin.
Notes: Respondents were asked whether they agree that "of the money the city spends on transportation, are we spending too much, about the right amount, or not enough on" bikes or trails. Margin of error was about ±4 percent.

Targeting Campaigns around Construction Schedules Is Difficult

One effort undertaken by the Final Mile program was to target neighborhoods expected to bear the brunt of street reconstruction, with the hope that doing so would induce more support among people living several blocks away from projects. More support, in theory, would blunt the negative attitudes expressed by a few direct neighbors. Neighborhood-based campaigns were undertaken in several ways. In some cases, billboards displayed advertisements in the communities where infrastructure was to be built. In others, social media targeted people by zip code. Last, in the pre-COVID-19 period, Final Mile funded door-to-door outreach and flyering through "street teams."

Interviewees described these approaches as moderately successful but difficult to implement because of the challenge of aligning advertising with construction schedules. Billboard advertisements had to be funded up front, but actual project implementation did not always follow the same timeline. Moreover, once authorities encouraged people to stay at home during the pandemic, those billboards no longer had as many viewers. In response, an employee at GSD&M told us that the program sought other approaches. For instance, Final Mile funded branded pizza boxes for delivery that might reach people no longer commuting to work.

Some interviewees believed that door-to-door conversations and flyering were ultimately most effective in terms of building local support for the cycling infrastructure investment. An advocate in Pittsburgh noted that these tactics ensured that every resident in a community affected by construction would have up-to-date information about what changes they could expect. In Denver, an advocate said personal contact allowed their organization to "explai[n] why there's less parking" in the context of new cycling projects. Nonprofits were able to coordinate these actions with city transportation departments through the frequent meetings that the Final Mile program funded. Unfortunately, these programs faltered in the face of the pandemic, which cut off most possibilities for nonprofits to hold in-person discussions with residents.

NIMBYism Remains a Challenge to Overcome

The staff at PfB and Wend who designed the Final Mile program told us they did not ever expect the program to be able to undercut "not in my backyard" or "NIMBY" attitudes against cycling investments. Rather, they hoped that, by leveraging the extensive arsenal of advertising and communications campaigns, the program would help the majority of people in favor of cycling projects

mobilize to support them. The polls they conducted demonstrated the widespread support for cycling investments that they sought. This public support would encourage politicians and other municipal stakeholders to dismiss the minority of people opposing the projects.

Despite this goal, NIMBYism remained an obstacle in every program city, making certain projects more difficult to undertake than Final Mile planners initially hoped. One big explanation for the continued salience of NIMBY sentiment is that those opposed to projects continued to be the most vocal in expressing their views about project implementation, particularly at in-person meetings. This opposition concerned city staff, who felt—even if personally in support of cycling investments—they had to respond to these members of the public as part of the review process for projects. People in neighborhoods and businesses along certain streets were particularly angered when the construction of an improved cycling facility required eliminating parking. Noted a New Orleans advocate, the local department of transportation "is risk averse." The director, they said, "sees success as not having anyone complain." This encouraged the city to overemphasize the feelings of those who were most vocally opposed, while undermining those of the people who were most supportive of investments. To some degree, this made sense: if the program's strongest supporters were not directly affected by these investments, it might be hard for the city to justify prioritizing their views over those of the opponents, who were directly affected.

Such NIMBYism had an effect not only on city staff but also on elected officials who responded to vocally expressed concerns—even when these views were not in the majority. Planners in several cities pointed to councilors acting as barriers to positive investments, sometimes specifically opposing projects in their wards where residents and business owners had been particularly adamant. A planner in Denver told us that this put staff on the defensive. "A lot of the time the city council doesn't support projects that require parking removal," they said. "It blows out and we have to show everyone how we are transparent, looking at alternatives."

Thus, even if countering NIMBYism was not a primary goal of the Final Mile program, the program's hypothesis that the majority's views could drown out the negative feelings of a few was not met. Perhaps other forms of advocacy designed to directly change the minds of NIMBY residents are necessary to ensure that programs of improvements like that undertaken as part of the Final Mile are completed.

Advocacy Organizations Have an Incentive to Maintain Their Own Communications Approaches

As we argued earlier, efforts to encourage improved links between nonprofit organizations and city governments were only partly effective. One major consequence of this failure to achieve unity was that the communications strategies, too, were not always as integrated as PfB and Wend leadership hoped. City officials felt that an integrated communications approach was difficult to maintain in the face of political pressure and day-to-day project-implementation needs. Facing both the need to retain an independent point of view, and the desire to maintain pressure on the city in ways that moved beyond the mileage goal of the Final Mile, nonprofit groups in several cities maintained an "inside–outside" strategy to advocacy and undertook their own campaigns alongside those funded by Final Mile.

Within municipalities, several interviewees told us that one hope was advocates would take the lead in communicating to the public. According to a planner in Pittsburgh, the "the city did not have experience" in undertaking such conversations, and by working with the nonprofit groups, they believed they could better share their message. But some city staff felt that the nonprofit groups were ineffective in performing this role. In one city, according to an interviewee, the advocates—tasked with leading outreach—seemed to be unable to complete their job. As a result, the city had to assume the task of public communications and developing presentations independently with little involvement from the nonprofit.

City governments also had difficulty establishing a common "line" for how to describe implementation of the cycling infrastructure improvements. Mayor's offices committed to Final Mile's mileage goals but did not pledge to undertake particular strategies to share information about project progress with communities involved. One consultant working in Providence said, "Not all agencies involved in the deployment of the program were on the same page as the mayor." A planner in Denver added that since city councilors had their own views, staffers felt they were not always sure to whose opinion they were supposed to respond. This ultimately meant that city departments "end up sort of working against one another," the Providence consultant said, making the task of coordinating messaging with nonprofits more complicated.

Advocates facing this environment felt that, in some cases, they had to strike out on their own. "I think we have good access" to city hall, one New Orleans organizer told us. "And with that access we can apply the light but consistent pressure . . . but I wish I had more access." A nonprofit advocate in Austin said that they did not have "very much coordination with the city" during communications

campaigns. The result was that advocacy organizations had an incentive to pursue a good cop–bad cop approach, where they worked through inside paths with the city when possible, but also campaigned independently outside of the municipal government when they felt that doing so was a necessary approach to getting projects underway.

The positive element of this nonprofit approach was that independence from the city and the Final Mile program allowed them to pursue a multimodal approach beyond the cycling infrastructure emphasis of PfB and Wend. Several of the nonprofit organizations already had been working in recent years to institutionalize this multimodal approach. For example, the Denver Streets Partnership was formed out of WalkDenver, transforming what had been a pedestrian-focused organization into one addressing the needs of pedestrians, cyclists, and transit riders. Denver Streets Partnership also has Bicycle Colorado on its steering committee. This new organization, according to an advocate, was seen as a "key way to improve resources and expand advocacy." The new nonprofit was able to address a broader range of issues than would have been possible had it focused only on cycling.

Upon review of a report draft, staff from PfB noted that our analysis provided few details of the community engagement and public meeting outreach that advocacy organizations had conducted. This work also corresponded with successful efforts to attract earned media, spearheaded by the project manager in each city. These efforts were each funded as a major element of the overall Final Mile program and seen as important by PfB and Wend to generating increasing public support for cycling investments. The interviews we conducted, however, did not reveal much about this element of the workstream; interviewees themselves barely discussed the efforts to engage in public meetings or the value of earned media. This may have resulted from a failure on our part to investigate this issue as deeply as possible, interviewees not seeing this engagement as particularly relevant, or the personal characteristics of the interviewees we selected for conversations. As such, additional research is necessary to assess the value of these efforts.

Targeted Infrastructure Investments Have Expanded Access

The Final Mile program prioritized accelerating cycling-network development in the five funded cities. Leveraging political campaigns and communications efforts, the program ultimately can be judged in terms of whether it expanded access to high-quality cycling infrastructure, and did so in a way that produced a network of paths that were equitably distributed. In this section, we use a combination of interview results and geospatial data analysis, combined with comparisons to cities outside of the Final Mile program, to make the following conclusions:

- Final Mile cities successfully achieved their goals of expanding their respective cycling networks by the end of 2021. This expansion accelerated over the program's life span and in 2021, each of the Final Mile cities constructed a record number of cycling infrastructure miles, led by Austin.
- Per capita, Final Mile cities considerably outperformed the group of peer cities in our analysis, completing much more protected cycling infrastructure. Before program rollout, there was no statistical difference in infrastructure investments between Final Mile and comparison cities. After rollout (beginning in 2019), the Final Mile Cities dramatically expanded their investments, adding more than three times the per-capita secure bike facility miles as comparison cities.
- Final Mile cities varied in terms of their commitment to protected cycling networks versus other types of investments, like bike lanes or neighborhood greenways. Some cities, like Austin, devoted much more of their resources to off-street trails, whereas others, like New Orleans, emphasized protected or buffered on-street bikeways. Protected bikeways accounted for a large share of infrastructure in Final Mile cities overall, but this is part of a nationwide trend not unique to the funded cities.
- On average, residents of Final Mile cities now have access to protected bikeways that is similar to comparison cities. This access, however, is somewhat worse for Asian, Black, and Hispanic residents in Final Mile cities than in comparison cities (though the difference is not statistically significant). In terms of equity of access by resident income, Austin and New Orleans have been more effective in reaching the most vulnerable community members.

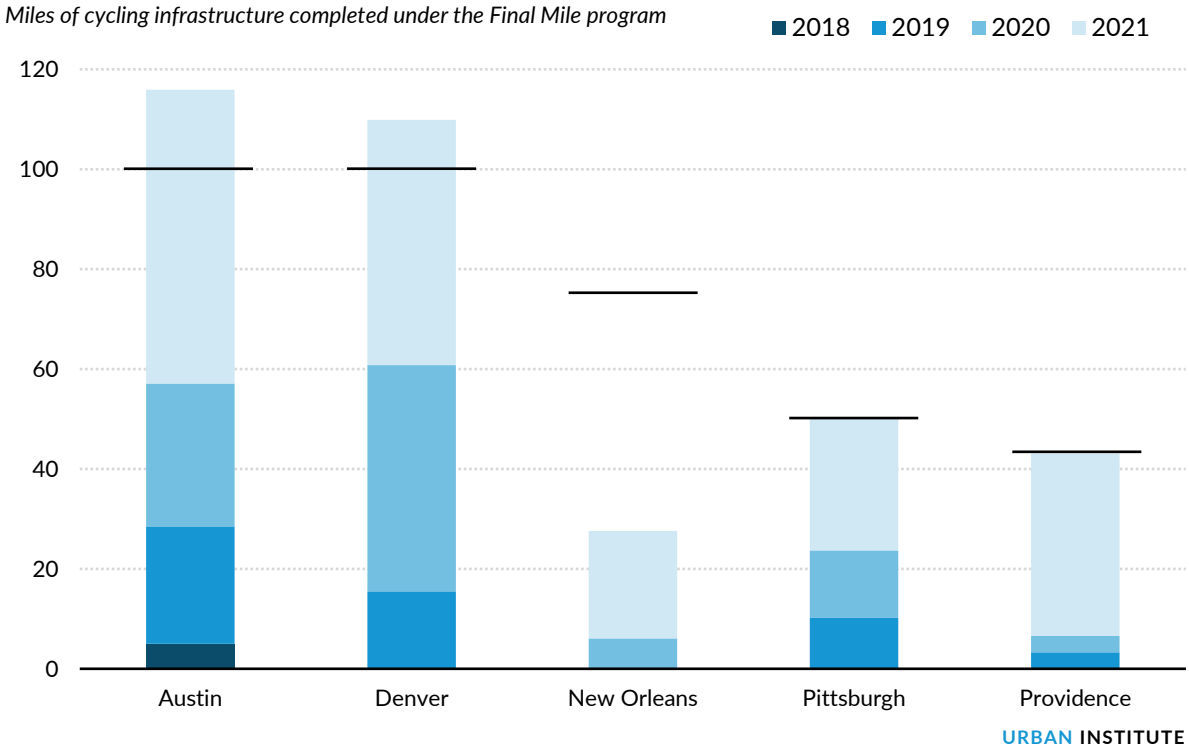
- More work is needed to ensure that Final Mile cycling improvements result in a long-term, effective network that will grow biking in each community.

Short-Term Program Goals Were Met, but Work Remains to Build Out Cycling Networks

Since the late 2010s, cities funded by the Final Mile program have worked steadfastly to expand their cycling networks. This commitment required considerable investment not only in infrastructure projects themselves but also in public institutions. An advocate in Denver, for example, told us the city had tripled its staff capacity working on cycling projects. Municipal governments also were undertaking "things that the cit[ies] didn't have a history of ever building," according to a Final Mile consultant. In this section we show that the Final Mile cities substantially expanded their investments in infrastructure in the years following mayoral commitments to a mileage goal.

FIGURE 8

All Final Mile Cities but New Orleans Met Their Cycling Investment Goals by 2021



Source: PfB, The Final Mile Q3 2021 Progress Report.
Notes: Cycling infrastructure includes sharrows, painted bike lanes, neighborhood bikeways, protected bike lanes, buffered bike lanes, cycle tracks, shared-use off-street paths, and trails. Black lines indicate mileage goals for each city.

Each Final Mile city expanded investments in cycling infrastructure over the program period (figure 8). Note that the cities commenced the program in different years; Austin, Denver, and New Orleans began the program before Pittsburgh and Providence. For each city, the number of miles completed was highest in 2021, in some cases after a particularly low start. These figures are not adjusted per capita or by municipal size; Austin and Denver have considerably larger populations and land areas than the other three cities (table 2). Despite the COVID-19 pandemic, each city met the goals they established when starting the Final Mile program except New Orleans, which has built considerably less so far than originally planned (about 30 versus 75 miles).

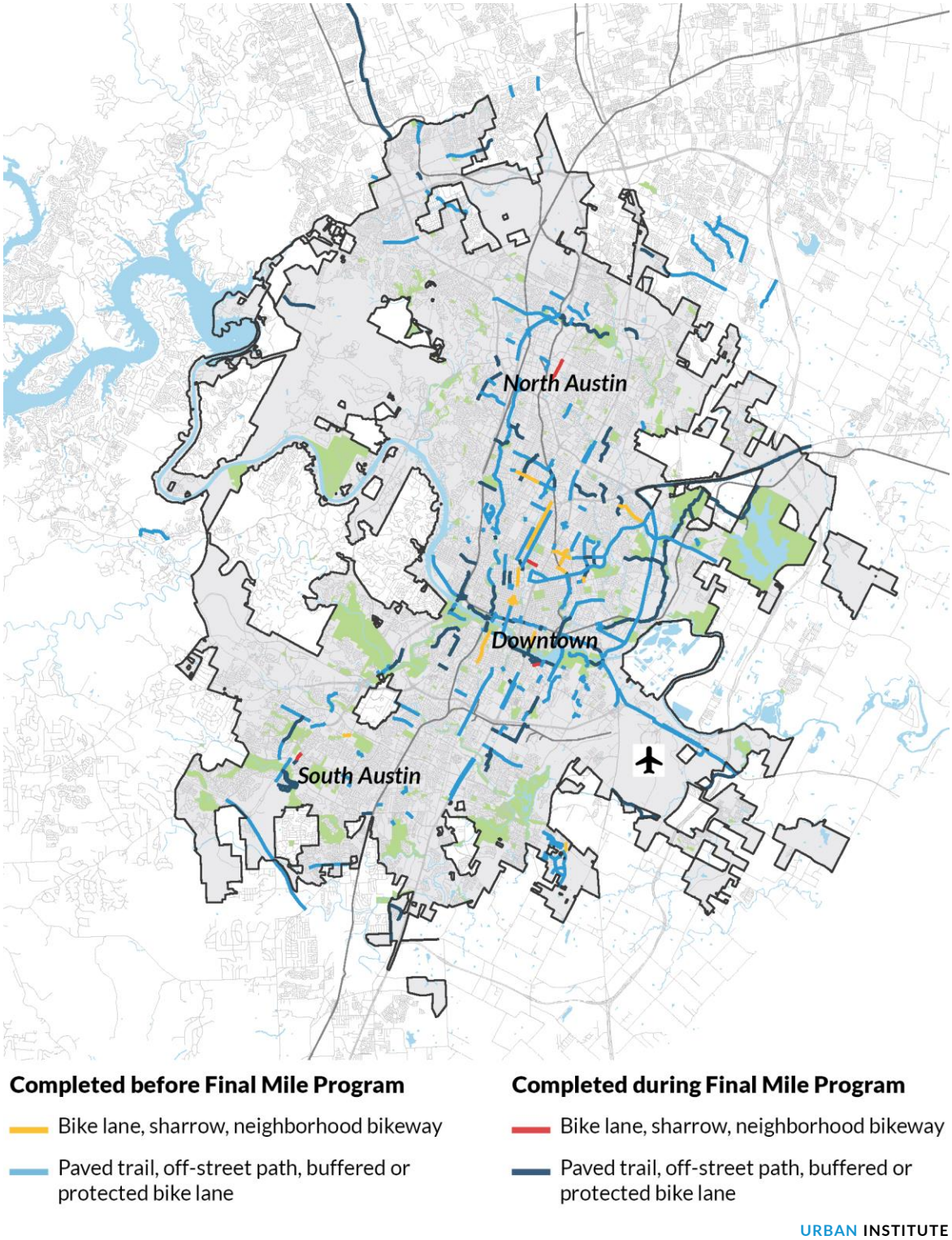
Building all this cycling infrastructure was tough. Noted a planner working in Denver, each project required "difficult conversations that require tradeoffs within the community." A consultant working nationally said "every project was hard . . . [as] cities are careful about how they design their infrastructure." The cities did, however, have the benefit of needing to meet a goal set by the mayor and backed up by the political and communications campaigns that PfB and Wend funded.

New Orleans's failure to achieve its mileage goals likely has several explanations. One is that, according to interviewees, there was only one major contractor available to conduct the work, which made getting multiple simultaneous investments off the ground difficult. Another was that the area where the city decided to focus its investments—the Algiers neighborhood, across the Mississippi River from downtown—featured roads that needed considerably more improvement than originally assumed. Last, consultants working on the program told us that the city itself—despite the assistance from PfB and Wend—lacked capacity "for managing task orders, projects, and assignments. There aren't enough people to do design work."

In figures 9 to 13, we map how the five funded cities expanded their cycling infrastructure during the Final Mile program, as compared to what had been accomplished in previous years. Each map illustrates protected bike infrastructure (paved, shared-use off-street trails and paths; buffered lanes; and protected lanes) versus nonprotected infrastructure (painted bike lanes, sharrows, and neighborhood bikeways). We do not map unpaved trails on these maps, though they account for a considerable share of investment in Austin and Denver. In the next section, we analyze how these investments were distributed in terms of their impact on equity of access by race, ethnicity, and income.

FIGURE 9

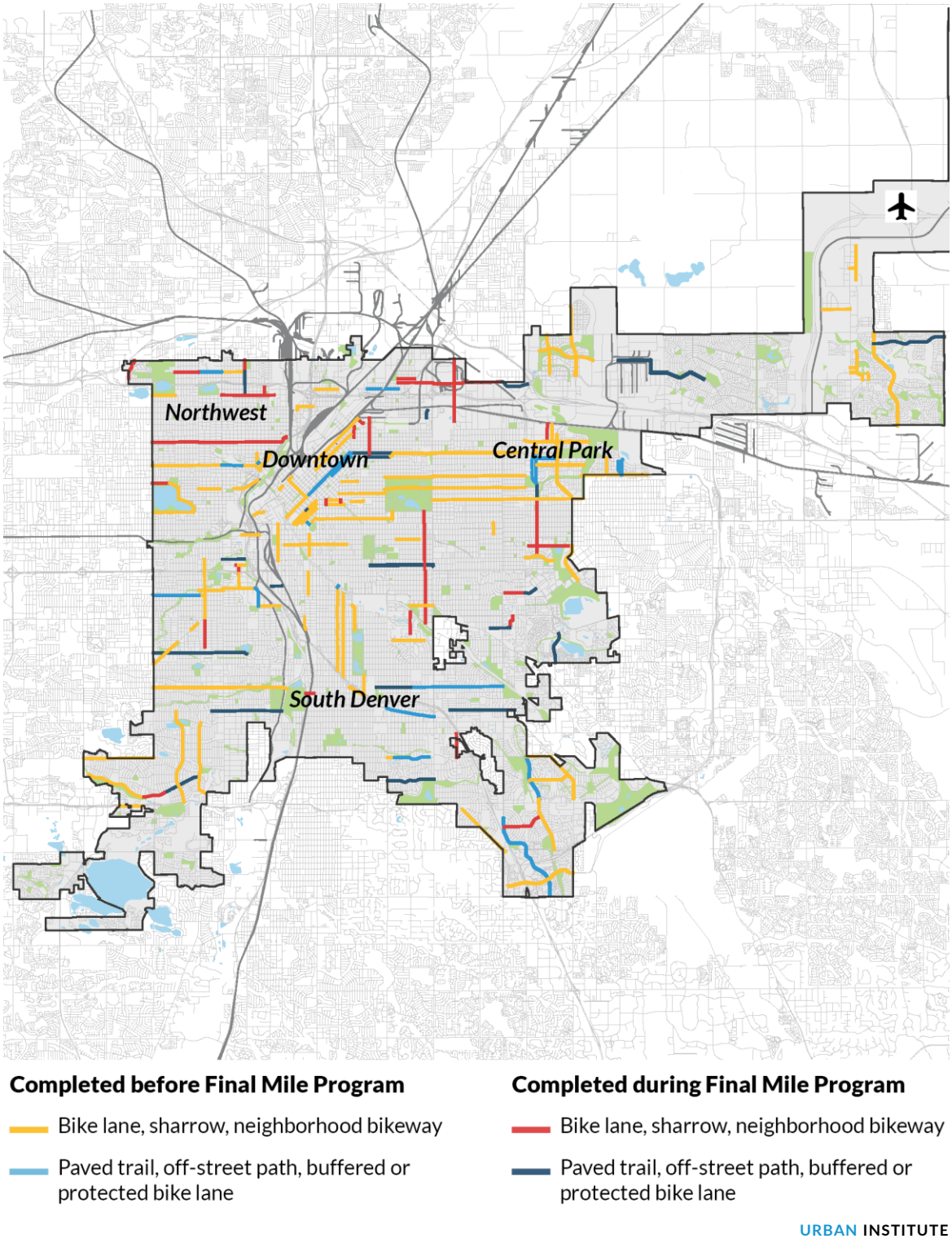
Cycling Infrastructure in Austin



Source: Authors, based on OpenStreetMap data prepared by PfB.

FIGURE 10

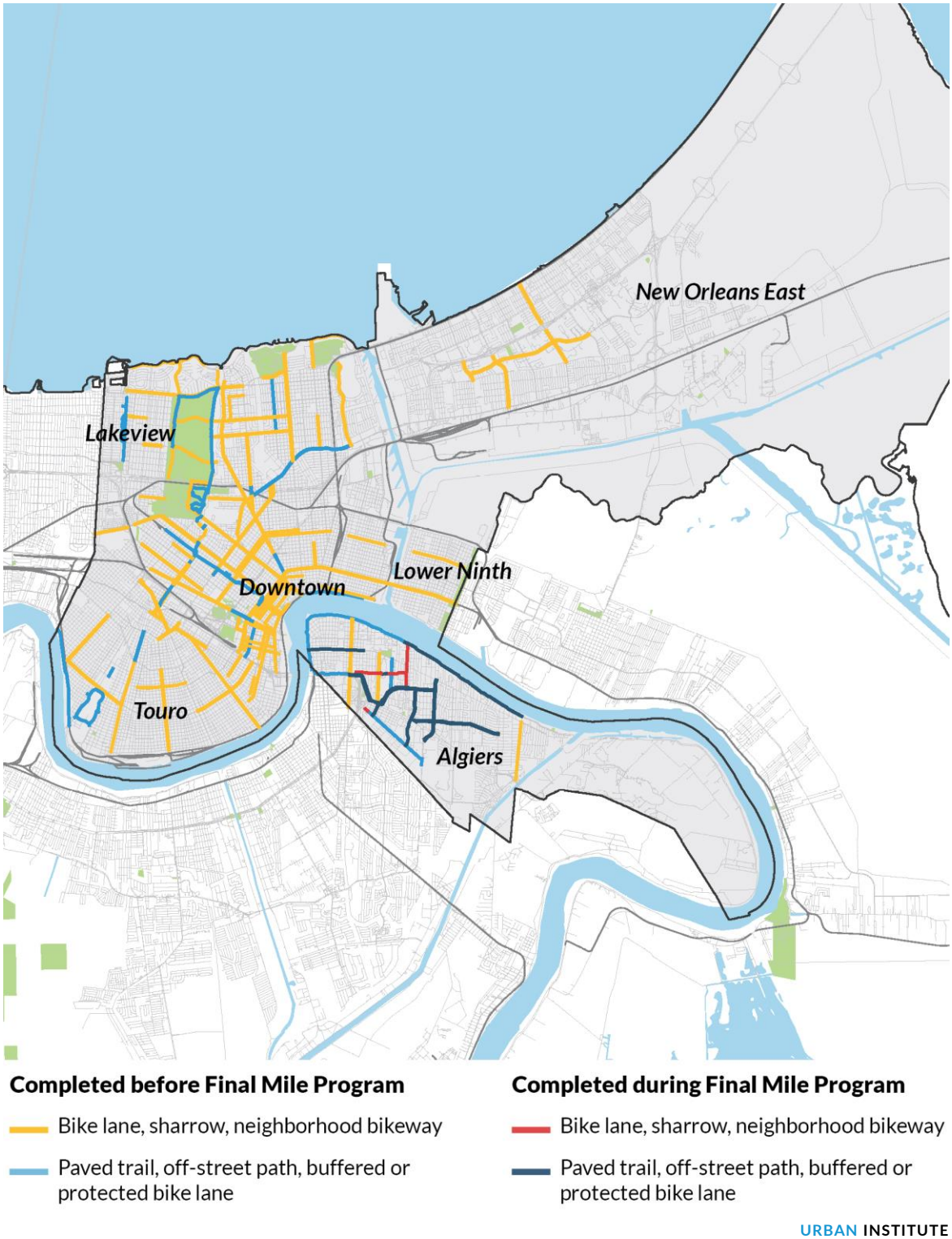
Cycling Infrastructure in Denver



Source: The authors, based on OpenStreetMap data prepared by PfB.

FIGURE 11

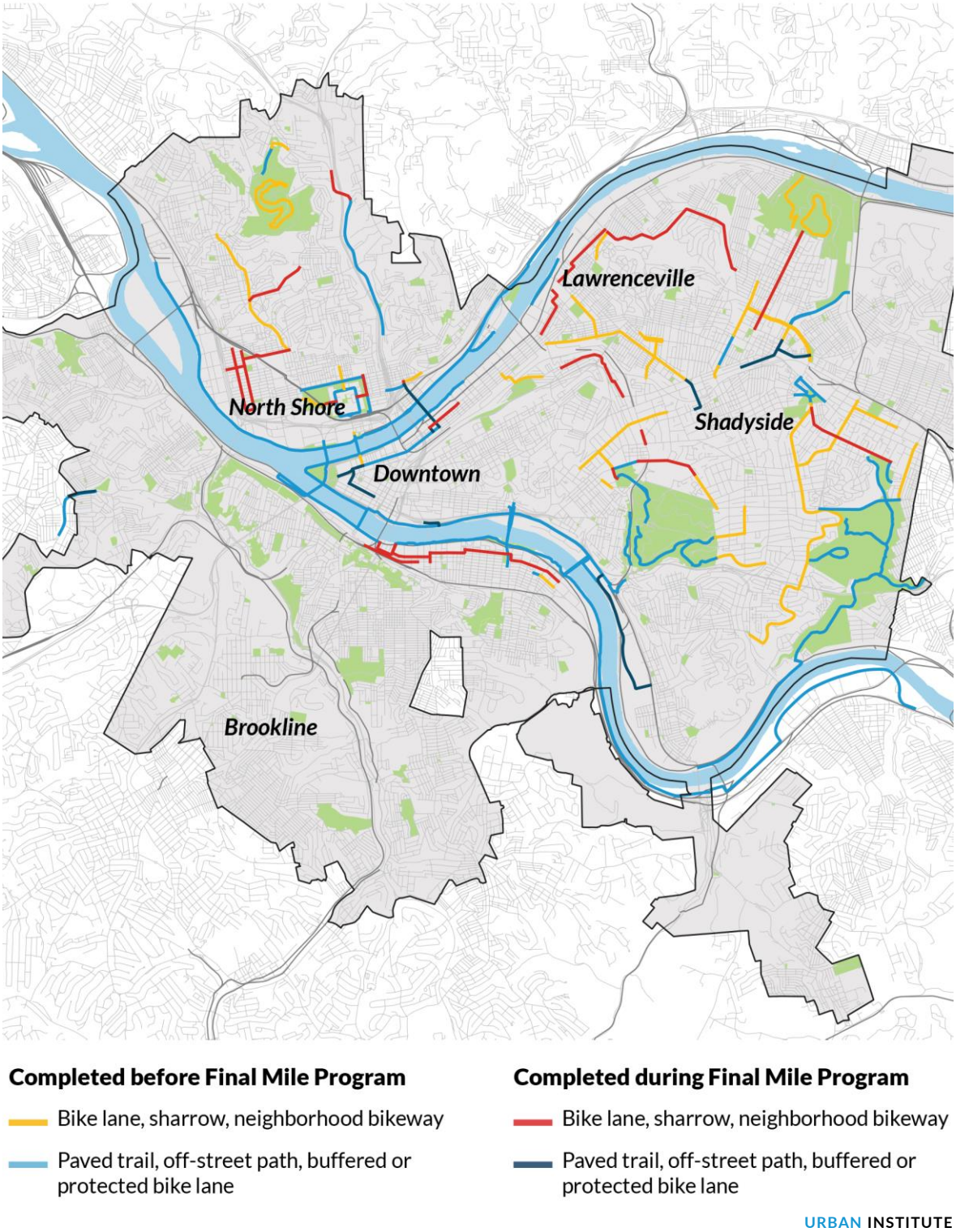
Cycling Infrastructure in New Orleans



Source: The authors, based on OpenStreetMap data prepared by PfB.

FIGURE 12

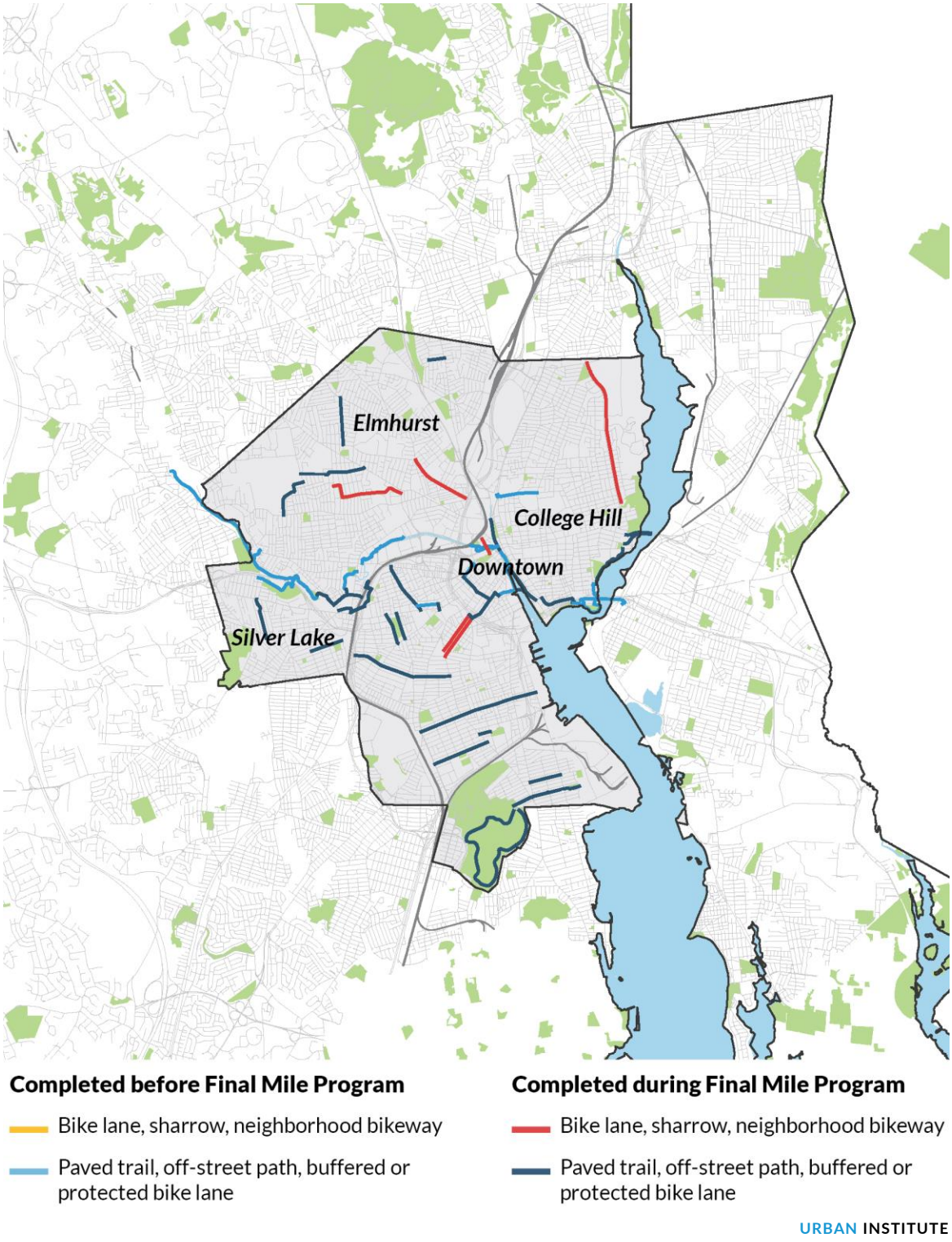
Cycling Infrastructure in Pittsburgh



Source: The authors, based on OpenStreetMap data prepared by PfB.

FIGURE 13

Cycling Infrastructure in Providence



Source: The authors, based on OpenStreetMap data prepared by PfB.

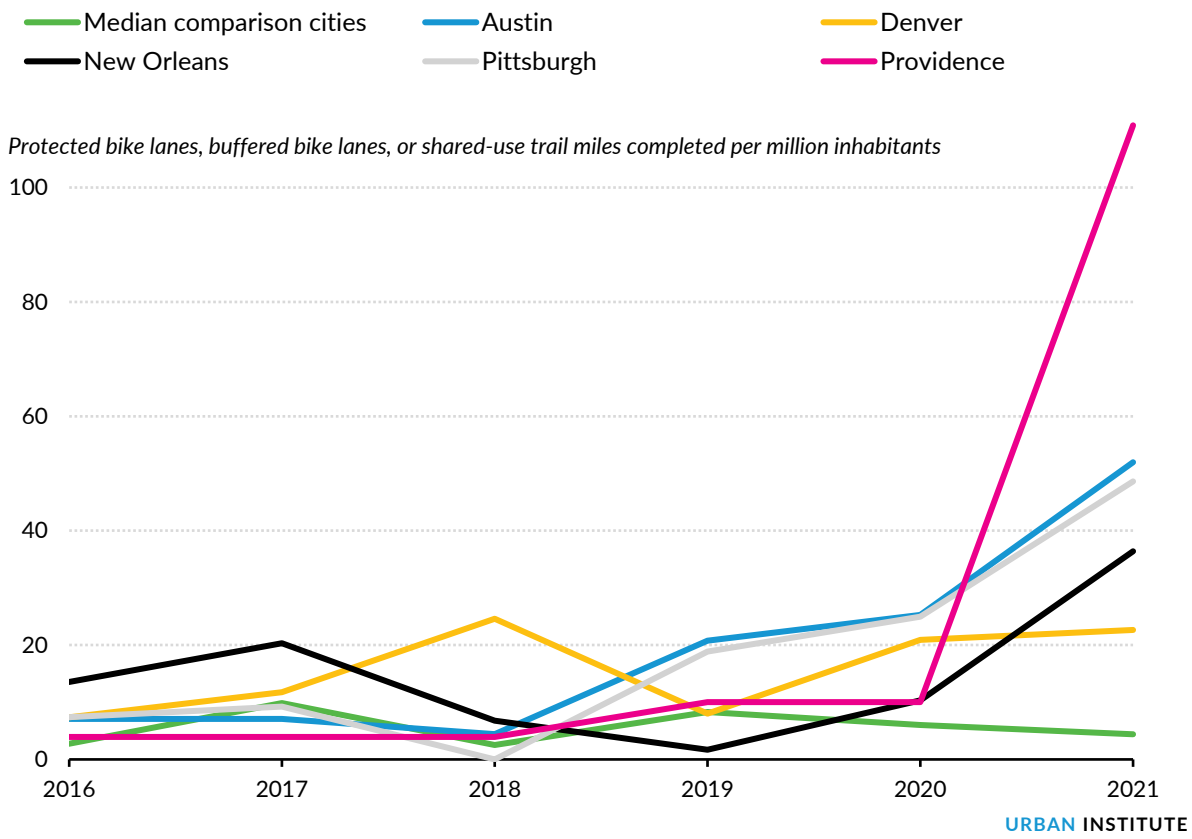
We compared the rollout of cycling infrastructure in the Final Mile cities with that in a cohort of communities around the country that we selected for their originally having been considered by PfB to join the program. This comparison has its limitations, as we noted in the introduction: to some degree, we may have selected on the dependent variable, meaning that since those other cities were not picked for Final Mile funding, it is possible that something about their preprogram characteristics made it unlikely that they would expand their investments in cycling infrastructure. On the other hand, those cities did express interest in the program. Also, the comparison cities, including Atlanta, Los Angeles, Nashville, and Portland, as well as Queens County (part of New York City), are a set of large and otherwise prominent municipalities that are subject to the same national changes as the Final Mile cities in public views related to cycling—suggesting that their infrastructure choices make for reasonable comparisons. In either case, the consequence is that we recommend acknowledging both the usefulness of these comparisons but also their downsides.

In figure 14, we graph the number of miles of secure bike facilities (i.e., protected bike lanes, buffered bike lanes, or shared-use off-street trails) completed per million municipal inhabitants in each year, from 2016 to 2021. Normalizing by local population allows us to compare investments between small, medium, and large cities. We compare the five Final Mile cities with the median of nine of the comparison cities for which we acquired data. In this comparison, we do not include data on neighborhood bikeways or bike boulevards, which can vary substantially in terms of their quality of cycling safety. As we describe, in some of the Final Mile cities, these two modes accounted for a significant share of the investment.

In the years before the Final Mile program began in any city, the comparison cities had roughly the same level of infrastructure construction as the funded ones. In 2017, for example, the median comparison city built 11.5 miles of protected bikeway per million inhabitants—more than Austin, Pittsburgh, or Providence, and slightly less than Denver. After program launch, however, and especially in 2021, the Final Mile cities increased their investment levels substantially. By that year, on a per-capita basis, each Final Mile city constructed far more protected cycling lanes than the comparison cities. Still, the trends in the Final Mile cities varied. Denver completed a roughly even level of projects between 2018 and 2021, with no clear influence of the Final Mile program beginning in 2019. New Orleans and Providence, on the other hand, accelerated their investment dramatically between 2020 and 2021, according to interviewees, as a result of a push resulting from the program.

FIGURE 14

Final Mile Cities Outperformed Comparison Cities in Terms of Mileage Constructed, 2016–2021



Source: PfB, individual cities.

Notes: Comparison cities included Atlanta; Bellevue, WA; Kansas City, MO; Los Angeles; Memphis; Nashville; Portland, OR; Queens County, NY; and Seattle. Data for comparison cities are not complete for each year between 2016 and 2021; medians only account for cities in the years for which there are data.

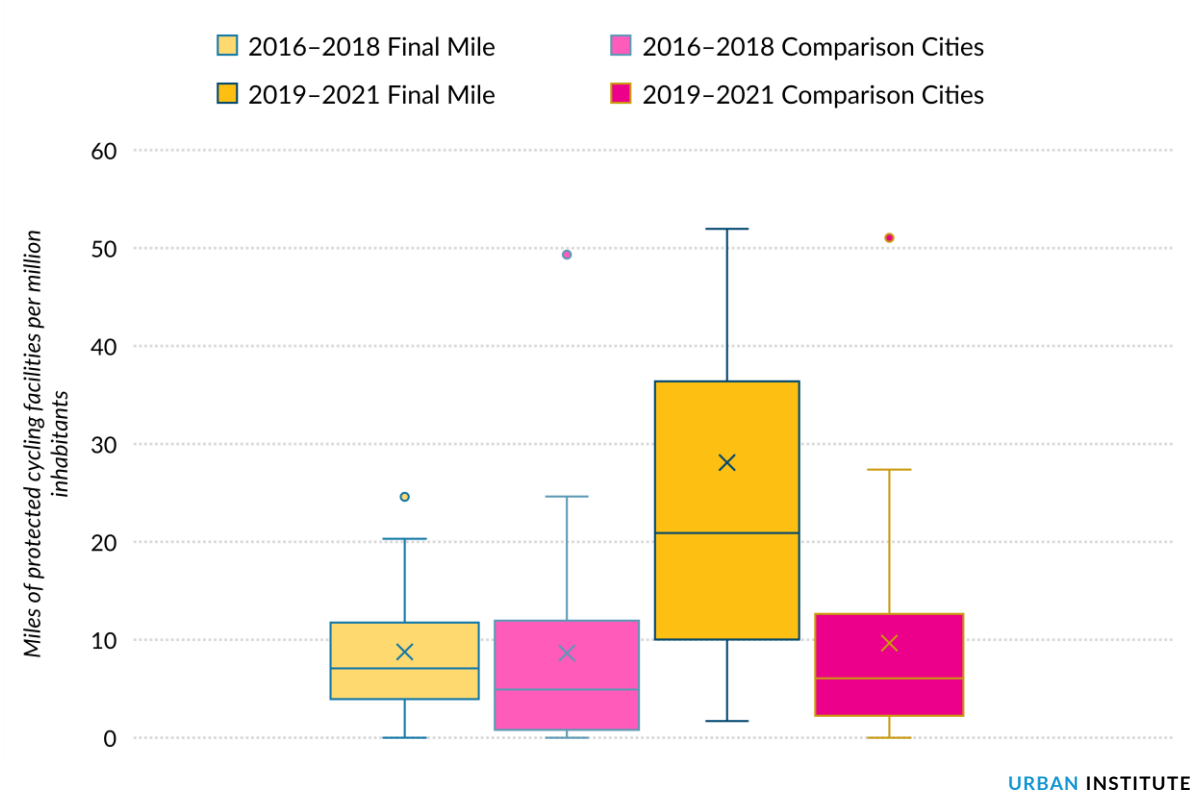
We also document these trends in figure 15, which is a box-and-whiskers chart comparing trends in the Final Mile cities with those in the comparison ones. To make these charts, we accumulated all available data for each of the cities and subsetted it by year and by whether the city had been funded under the Final Mile program. In 2016 to 2018, entirely before the Final Mile program, the funded cities invested in a number of protected bike lane miles very similar to those in the comparison sample. There was no statistical difference between the investments in the different groups of communities. In these preprogram years, the average Final Mile city added 8.8 miles of secure bike infrastructure per million inhabitants per year (median of 7.1 miles) versus 9.6 miles per million inhabitants per year for the average comparison city (median of 5 miles).

On the other hand, in the years 2019 to 2021 (which includes pre–Final Mile investments in Pittsburgh and Providence), figure 15 shows a dramatic difference in the distribution of mileage

investments in the Final Mile versus comparison cities. The average Final Mile city completed 28.1 miles of secure bike infrastructure per million inhabitants per year (median of 20.9 miles) compared with 9.7 miles per million inhabitants per year in the average comparison city (median of 6.1 miles). Using a heteroscedastic, two-tailed *t*-test of means, we found a probability of only 0.025 that these two groups are statistically similar (this probability would be even lower if we excluded the pre–Final Mile data from Pittsburgh and Providence). This indicates that the construction levels in the Final Mile cities were significantly higher than those in the comparison cities. And although there was a statistically significant increase in mileage construction in the Final Mile cities in the program period compared with the previous years, there was no statistically significant increase at all in the comparison cities.

FIGURE 15

Final Mile Cities Outperformed Comparison Cities in Terms of Mileage Constructed



Source: PfB, individual cities.

Notes: Comparison cities included Atlanta; Bellevue, WA; Kansas City, MO; Los Angeles; Memphis; Nashville; Portland, OR; Queens County, NY; and Seattle. Data for comparison cities are not complete for each year between 2016 and 2021; medians only account for cities in the years for which there are data. We counted only cycling facilities that are protected bike lanes, buffered bike lanes, or off-street shared-use trails. Sample sizes: 15 for Final Mile cities in both periods, 21 for comparison cities in the early period, and 18 for comparison cities in the later period.

The data in figure 15 demonstrate compellingly that the Final Mile program was effective in generating considerable cycling-network growth in each funded city. Even so, the two years of investment during the program represent only a small share of the overall networks planned by each of the cities. Pittsburgh's hope, for example, is to ensure that all city households are within a quarter-mile of quality cycling facilities, and that the share of residents who bike doubles by 2030. Noted one city employee, the city wants to make "joy" a goal, to be able to provide "enjoyable experiences" by bike. Denver has a similarly ambitious goal: achieving a 50 percent commuting mode share for transportation options other than the automobile by 2039. Currently more than two-thirds of commuters drive to work alone there.

In each city, there remain dozens of miles of infrastructure yet to be completed, but the cities vary in their commitment to actually funding those projects. According to data compiled by PfB in November 2021, Austin, Denver, and Providence have plans for more than double the number of miles of bike infrastructure than they have completed thus far. In Denver, for example, the city has completed about 440 miles of improved cycling projects but wants to build more than 1,050 miles over the long term. Because of significant local funding sources, including the large proceeds funded by voter-passed referenda, PfB notes that both Austin and Denver have objectives to add an additional 200 and 260 miles, respectively. But New Orleans has no clear plan to achieve more than 80 percent of its proposed network—and Austin and Denver both need years to identify approaches to build out about 400 miles of additional infrastructure. In other words, there is a lot more work to be done, far beyond the Final Mile timeline. Another way to think about it: even at the very high 2021 construction levels, it would take more than 11 years for both Austin and Denver to complete their projects.

Local Governments Prioritize Meeting Quantitative Goals, Not Necessarily Best Practices

The mileage goals established by the Final Mile program did not ensure that the outcomes actually perceived by cyclists on the ground would be appreciated. The infrastructure investments we have described included protected bike lanes and off-street shared-use paths—but also, in some cases, painted bike lanes and neighborhood bikeways, both of which improve on previous conditions but nevertheless did not effectively ensure cyclist safety. Indeed, in our examination of Final Mile investments versus those of comparable communities, we found that in several funded cities, insecure

infrastructure accounted for a large share of projects completed. In this way, Final Mile cities were not much different from municipalities elsewhere in the country.

High-quality, comfortable bike facilities met opposition from neighbors worried about parking removal and other changes to their communities. This in turn weakened municipal commitment to ensuring the quality of as much of the infrastructure as possible. City staff, under pressure by mayor's offices, nonprofit organizers, and funders from PfB and Wend, were risk averse. In some cases, they prioritized being able to say that they had completed the mileage goal, acknowledging that the mileage goal did not require that those miles all be in the form of protected facilities.

This situation meant cities sometimes selected projects that were easiest to accomplish, whether that meant downgrading the quality of infrastructure on a specific route or choosing neighborhoods where investments met less resistance. In Denver, an advocate told us that there was not "adequate public sector support and city leadership to get things done over the objections of people who didn't want to lose parking." Said an organizer in Pittsburgh, "The city was really motivated by a mileage number rather than a quality number, like the quality of the network." Making matters worse, in some cases advocates felt that the Final Mile project manager was not focused on what mattered in terms of bike safety. "[Their] focus is on the project like it's a political campaign," an advocate said. "[Their] focus is on the [mileage] goal over quality of outcome."

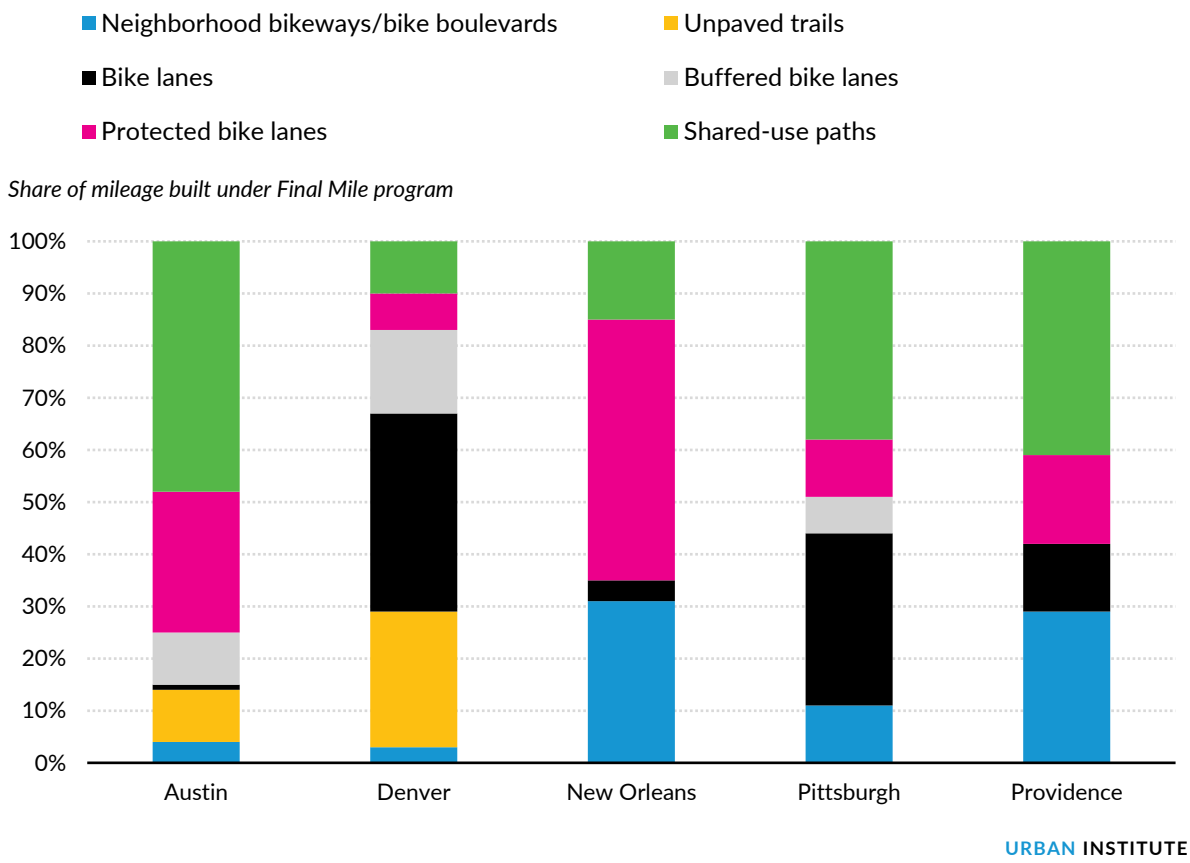
The cities involved in the Final Mile program took a variety of approaches to expanding their cycling infrastructure, some of which substantiated the skeptical views of certain interviewees. Among the five cities, Austin devoted by far the largest share of its investments to secure bike facilities, like shared-use paths, protected bike lanes, and buffered bike lanes; more than 85 percent of the mileage it constructed fell into that category (figure 16). In Denver, on the other hand, only about 30 percent of new cycling mileage fell into this type of investment, affirming the Denver advocates' arguments that projects did not meet as high of a quality goal as necessary. Said a Denver advocate, "The definition of high comfort [of bike facilities] is somewhat subjective, and a lot of the projects have been downgraded from what was originally planned."

New Orleans and Providence focused their investments to some degree on neighborhood bikeways or bike boulevards, each devoting about 30 percent of their new mileage to those categories. Denver and Pittsburgh each devoted about 30 percent of their infrastructure to painted bike lanes. And Austin and Denver added some facilities that were unpaved—not necessarily easy for a biking commuter to use. The effectiveness of these different sorts of investments is context dependent, so it is difficult to judge the safety of the Final Mile–funded networks by this quantitative

analysis alone. Neighborhood bikeways may be just as safe as buffered bike lanes if they are designed well to slow cars and maximize cyclist visibility.

FIGURE 16

Cities Varied in the Degree to Which Their New Cycle Infrastructure Provided Protected Access

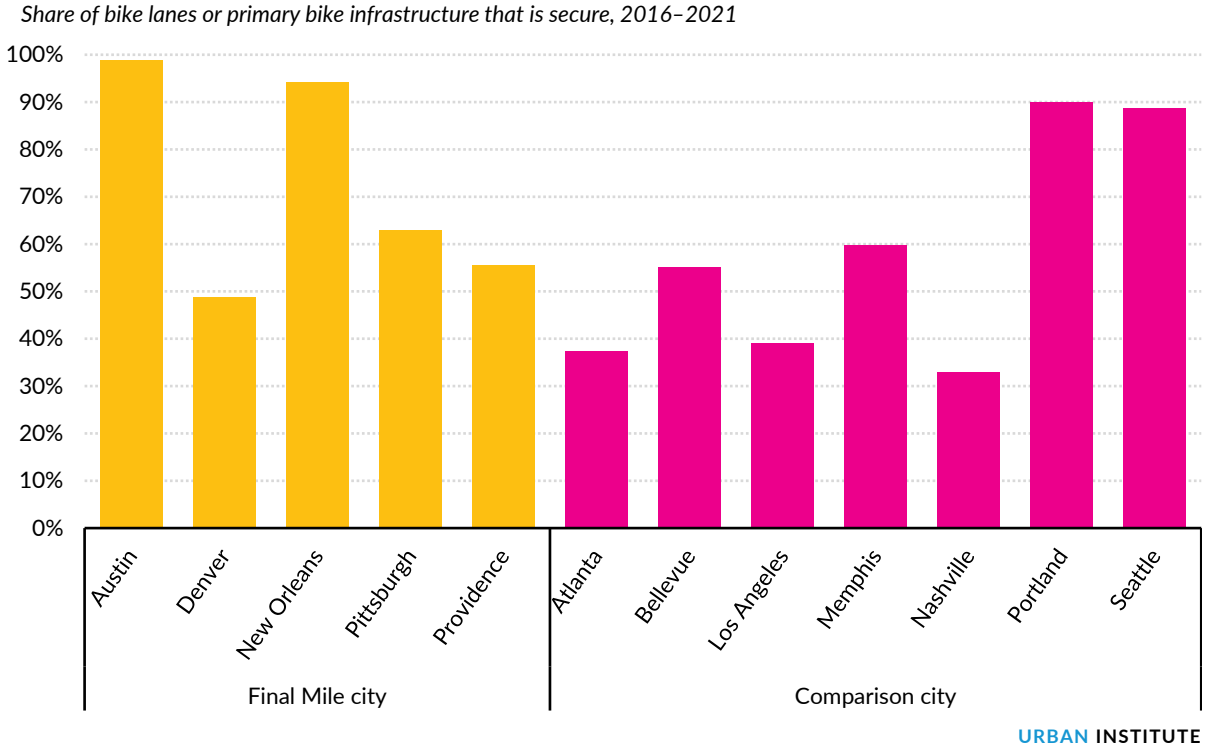


Source: PfB, the Final Mile Q3 2021 Progress Report.

We identified the share of bike infrastructure that was secure (protected bike lanes, buffered bike lanes, and shared-use paths) versus unsecure (painted bike lanes) in order to make a fair comparison between the Final Mile cities and others for which we collected data throughout the country. This comparison (figure 17) does not account for unpaved trails or neighborhood bikeways. The average Final Mile city had a somewhat higher share of its new bike lanes devoted to protected infrastructure than the comparison cities, but the levels varied. Austin and New Orleans devoted more than 90 percent of their lanes in this category to this purpose, similar to Portland and Seattle over the 2016–2021 period. Denver and Providence, however, had much lower levels—only about 50 percent—though this commitment to protected lanes was still higher than in Atlanta, Los Angeles, or Nashville, where the majority of bike infrastructure has recently been in the form of painted bike lanes.

FIGURE 17

Compared to Other Cities, Final Mile Cities Had a Somewhat Higher-than-Average Share Devoted to Secure Bike Infrastructure



Source: PfB, individual cities.
Notes: Only counting bike infrastructure that is in the form of bike lanes, protected/buffered bike lanes, or shared-use trails. Sharrows and neighborhood bikeways are not included. Data for comparison cities are not complete for each year between 2016 and 2021; averages are just for years for which there are data.

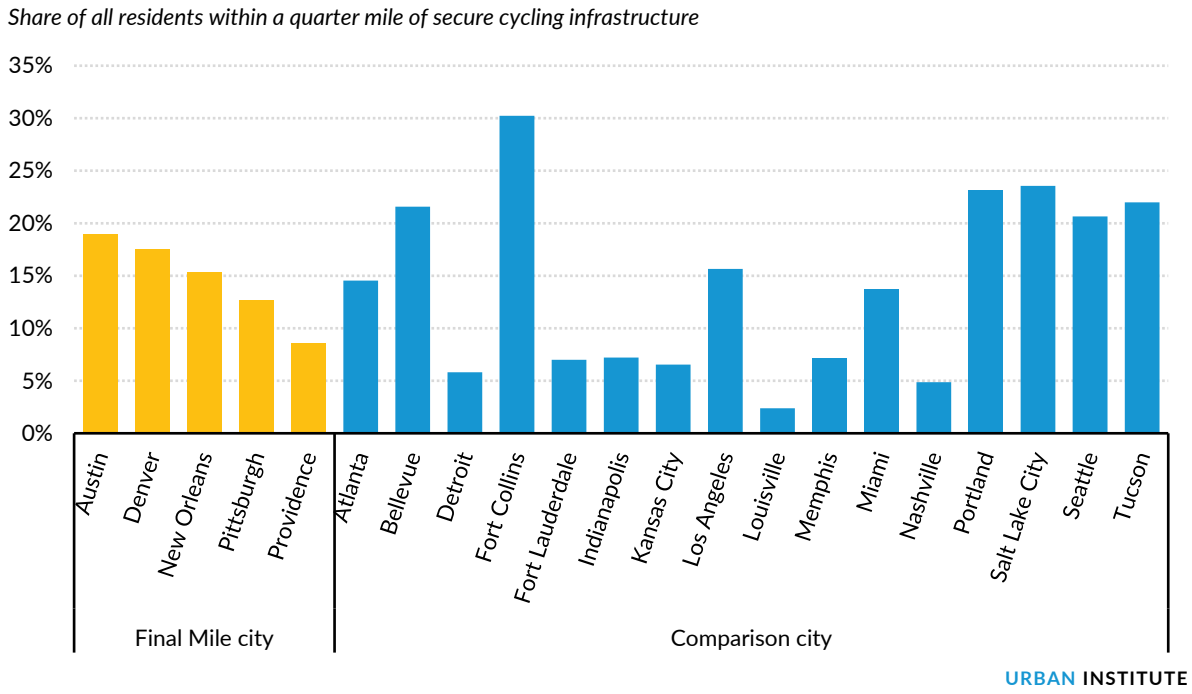
Using data from OpenStreetMap, we compared accessibility to cycling infrastructure in the Final Mile cities with that of 16 comparison cities elsewhere in the country. These data are updated to 2021, but may not reflect all investments, as OpenStreetMap data are maintained by volunteers. Note that in this comparison, we evaluate investments made during the Final Mile program and in the periods before. As such, it is possible (even likely, given the scale of investment documented herein) that the Final Mile cities accelerated local accessibility to cycling more rapidly than peer communities. But we do not have adequate historic data about infrastructure location to be able to measure changes in accessibility over time.

We measured the share of all residents in each of the communities who lived within a quarter-mile of some form of secure cycling infrastructure (protected bike lane, buffered bike lane, or off-street shared path; figure 18). In no city we examined did more than 30 percent of residents have convenient

access to this sort of infrastructure; in the Final Mile cities, the share ranged from 8 to 19 percent. The investments made so far thanks to the program have ensured that the Final Mile cities are in the middle of the pack in terms of investment—but still not as high for overall accessibility as national leaders Bellevue, Washington; Fort Collins, Colorado; Portland, Oregon; Salt Lake City; Seattle; and Tucson.

FIGURE 18

Final Mile Cities Are in the Middle of the Pack in Terms of Residential Accessibility to Secure Cycling Infrastructure

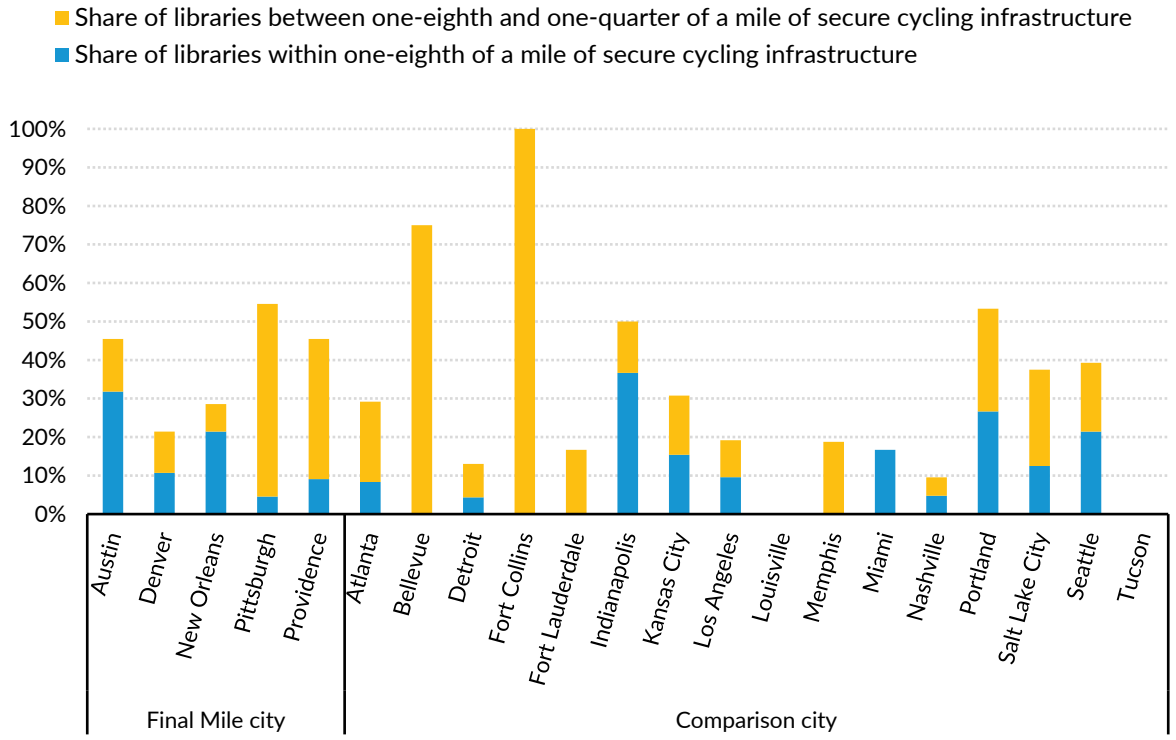


Source: PfB; American Community Survey 2015–2019.
Notes: Data from 2021, based on modified OpenStreetMap data from PfB.

We also measured the degree to which libraries in the Final Mile cities and comparison communities were accessible to secure cycling infrastructure. We chose libraries as a typical public service because we had access to data on library locations in each city studied. Figure 19 graphs the share of such libraries within one-eighth mile, or between one-eighth and one-quarter mile, of secure bike routes. Overall, Final Mile cities outperformed the others; the median Final Mile city had 11 percent of its libraries within one-eighth mile of a secure bike lane, versus 7 percent for the other cities. The median Final Mile city had 45 percent of its libraries within one-quarter mile of such lanes, versus 24 percent for the other cities. That said, Denver had somewhat lower accessibility to its libraries than the average non–Final Mile city.

FIGURE 19

Final Mile Cities Featured Better-than-Average Accessibility to Libraries



URBAN INSTITUTE

Source: PfB; American Community Survey 2015–2019; Public Libraries Survey, Institute of Museum and Library Services 2018.
Notes: Data from 2021, based on modified OpenStreetMap data from PfB.

Cities funded by the Final Mile program thus still have considerable work to do to ensure that their residents have adequate access to convenient, safe cycling infrastructure. If the situation has improved, it likely has not improved enough yet to ensure that everyone who wants to get on a bike can do so without fear.

Cities Vary in Their Commitment to Building a Network of Dedicated Cycling Infrastructure

Beyond creating high-quality cycling infrastructure, one of the key goals of the Final Mile program was to create a usable network for cyclists, ensuring that they would be able to move around the city, not simply be isolated along individual corridors. The maps in figures 9 to 13 show clearly that, despite progress, none of the cities has fully realized a municipal cycling *network*. Most cyclists continue to

face unsafe conditions along their routes in all of the Final Mile cities—just as in almost every other US city.

That said, those working on cycling in the communities were quick to point out that the Final Mile was associated with a shift in mentality among city staff. A consultant in Pittsburgh said that the bike network, previously "kind of disjointed," was subject to a process designed to realize an actual network. An advocate in Denver told us that "there has been a shift toward a connected network, from a series of disconnected street segments," which they said had been the "previous approach."

When it came to choosing which investments to prioritize, Denver's grid of streets made it feasible to identify key missing north–south and east–west segments that built upon previous work. In New Orleans, the city's decision to focus on the Algiers neighborhood meant that section of the city became outfitted with a grid of high-quality, protected lanes—modeling what change could eventually look like throughout the rest of the municipality. And city staff in Pittsburgh emphasized that the new cycling infrastructure had targeted key connections for what was a "previously fragmented network," according to one official. As a result, while only 40 percent of lanes previously had been linked with one another, now 80 percent are.

Efforts to Expand Access to a Wide Spectrum of the Population Have Partly Been Achieved

The historic dominance of wealthy white men in the cycling advocacy movement was mentioned repeatedly by stakeholders we interviewed. Many of those with whom we discussed the issue believed that bike infrastructure had inappropriately focused on the needs of that dominant group over time. One hope expressed by staff at PfB and Wend who designed the Final Mile program was that by expanding communication to a wider spectrum of the population, the result would be a cycling network more reflective of everyone's needs. If this could be achieved, it would mean better access for people of color and people with low incomes.

Despite the interest the Final Mile program generated for encouraging equitable access to high-quality cycling infrastructure, we find that the routes selected for investment were not adequate to prioritize people of color's access needs, at least when contrasted with the comparison cities. To conduct this analysis, we collected data from OpenStreetMap and cleaned it using the methods described in the introduction. Unfortunately, this approach does not allow us to make comparisons over time, because reliable historical data on the location of bike routes were not available (the data

we used in the preceding section, on total cycling infrastructure, were manually collected from the cities themselves). As a result, we can only make an estimate of cycling facilities in 2021, at the conclusion of the Final Mile program.

We quantified access to protected cycling facilities for people by race and ethnicity (Asian, Black, Hispanic, and non-Hispanic white) in each community, and compared the share of people of that background with access to infrastructure overall (figures 20–23). These data only reflect access to secure infrastructure (protected bike lane, buffered bike lane, and off-street shared-use paths—the highest-quality infrastructure for cyclists to use), and include investments made prior to the Final Mile program. An example to interpret these figures: the average Asian resident in Atlanta had 1.5 times the access to a secure bike facility as the average Atlanta resident overall.

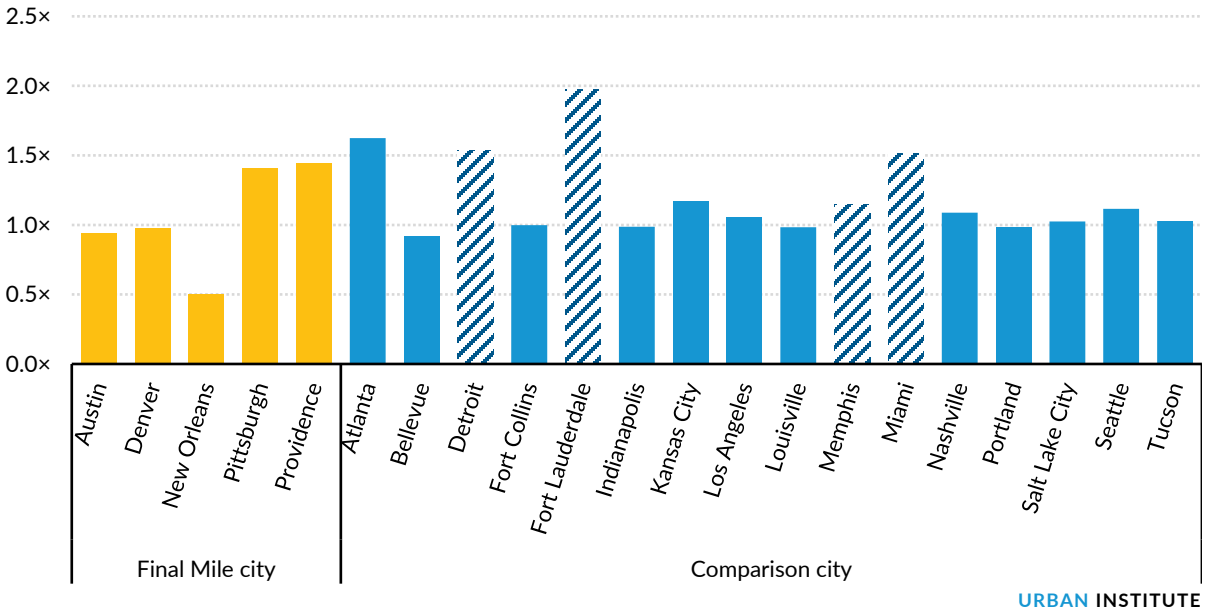
The data in figures 20 to 23 show that, on average, the Final Mile cities provided modestly worse access to people of Asian, Black, and Hispanic backgrounds compared to the comparison cities—while providing modestly better access to white people. Black residents in the median Final Mile city had 91 percent of the access to cycling infrastructure compared to the population as a whole, while Black people in the comparison cities had the same level of access as the general population. Hispanic residents had 94 percent of the access as the population as a whole in the median Final Mile city, compared to 98 percent in the other cities. And white residents had 105 percent of the access of the population as a whole in the median Final Mile city, compared to 101 percent in the other cities.

Importantly, these differences were not statistically significant; as such, statistically the Final Mile cities provided similar access to secure cycling infrastructure as the comparison cities. Moreover, because we were unable to collect reliable historical data, we cannot measure the impact of the Final Mile program *alone*. It is possible that the Final Mile cities made considerable inroads toward more equitable access beyond that which preexisted the program. Even so, the investments during the Final Mile program were so considerable that the outcomes we measure here are relevant to understanding the program's impact. In Providence, for example, more protected bike lane mileage was completed in 2019 through 2021 than had existed ever before in the city.

Despite these caveats, we did find considerable variation between the Final Mile cities that is worth noting. Austin and Denver—the two Final Mile cities with the most extensive networks—provided close to equal levels of access for people of all the racial or ethnic backgrounds that we studied. New Orleans provided low access to Asian people and high access to white people; Pittsburgh provided high access to Asian people and low access to Black people; and Providence provided high access to Asian and white people and low access to Black and Hispanic people.

FIGURE 20

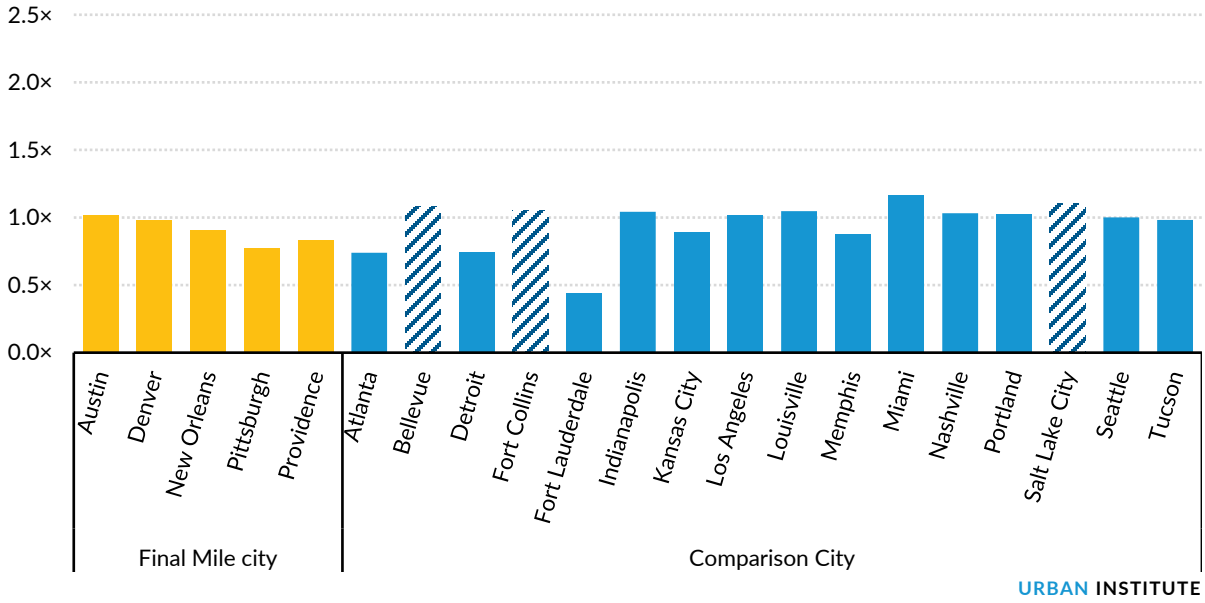
Comparing Asian Resident Access to Protected Cycling Facilities with Citywide Average



Source: PfB; American Community Survey 2015–2019.
Notes: Data from 2021, based on modified OpenStreetMap data from PfB. Cities with less than 3 percent Asian populations are striped.

FIGURE 21

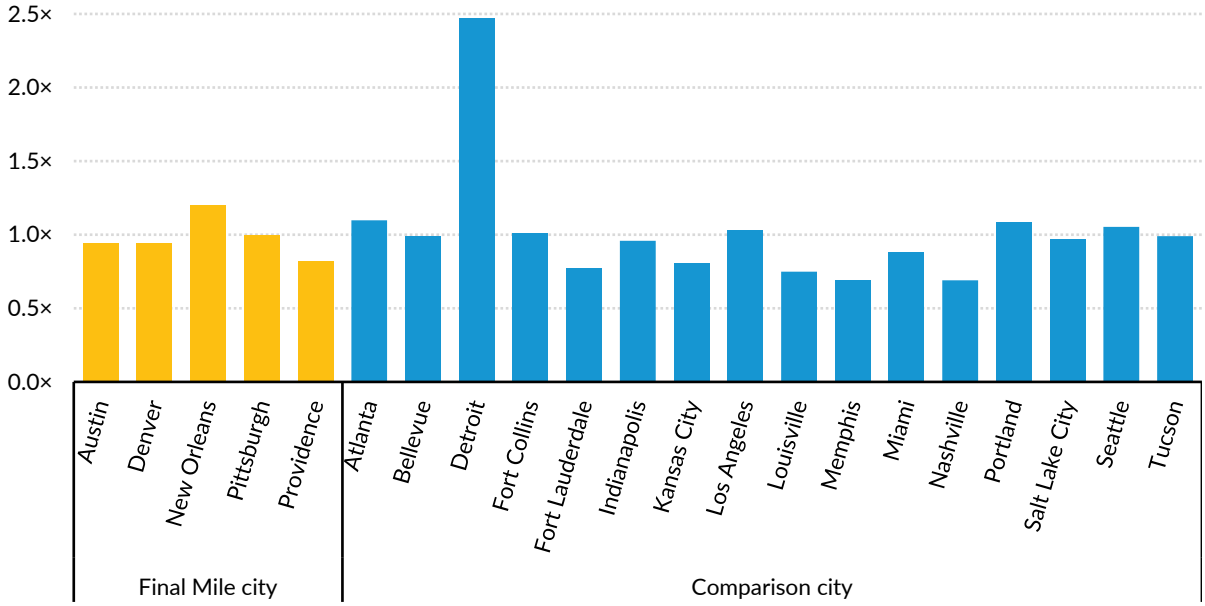
Comparing Black Resident Access to Protected Cycling Facilities with Citywide Average



Source: PfB; American Community Survey 2015–2019.
Notes: Data from 2021, based on modified OpenStreetMap data from PfB. Cities with less than 3 percent Black populations are striped.

FIGURE 22

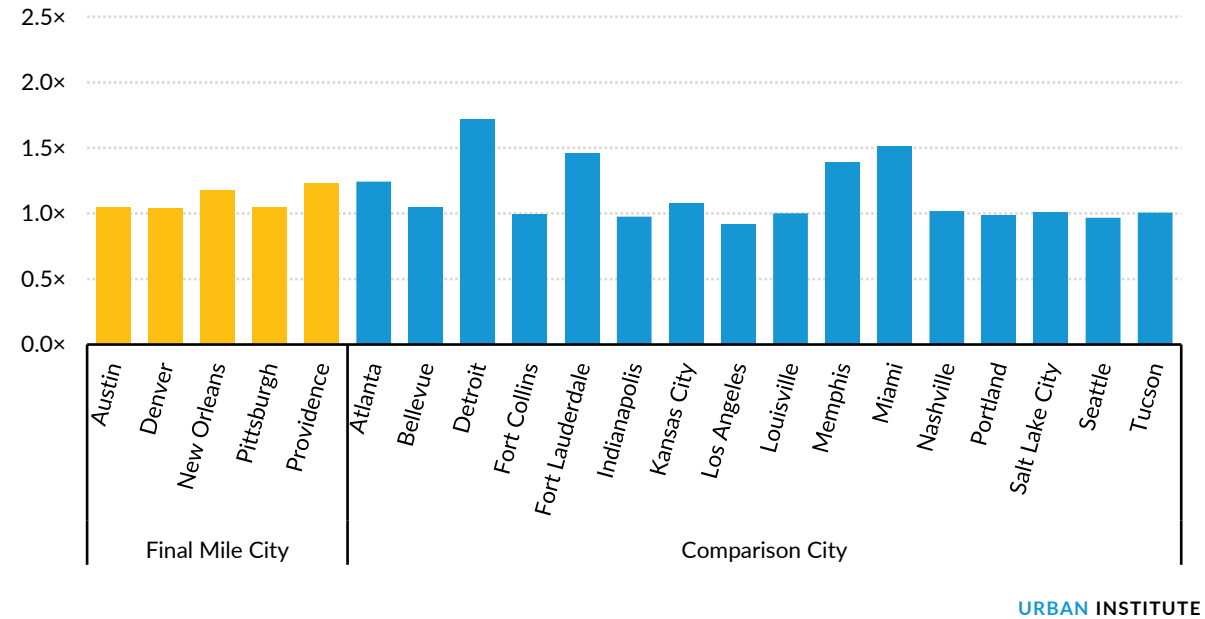
Comparing Hispanic Resident Access to Protected Cycling Facilities with Citywide Average



Source: PfB; American Community Survey 2015–2019.
Notes: Data from 2021, based on modified OpenStreetMap data from PfB.

FIGURE 23

Comparing White Resident Access to Protected Cycling Facilities with Citywide Average

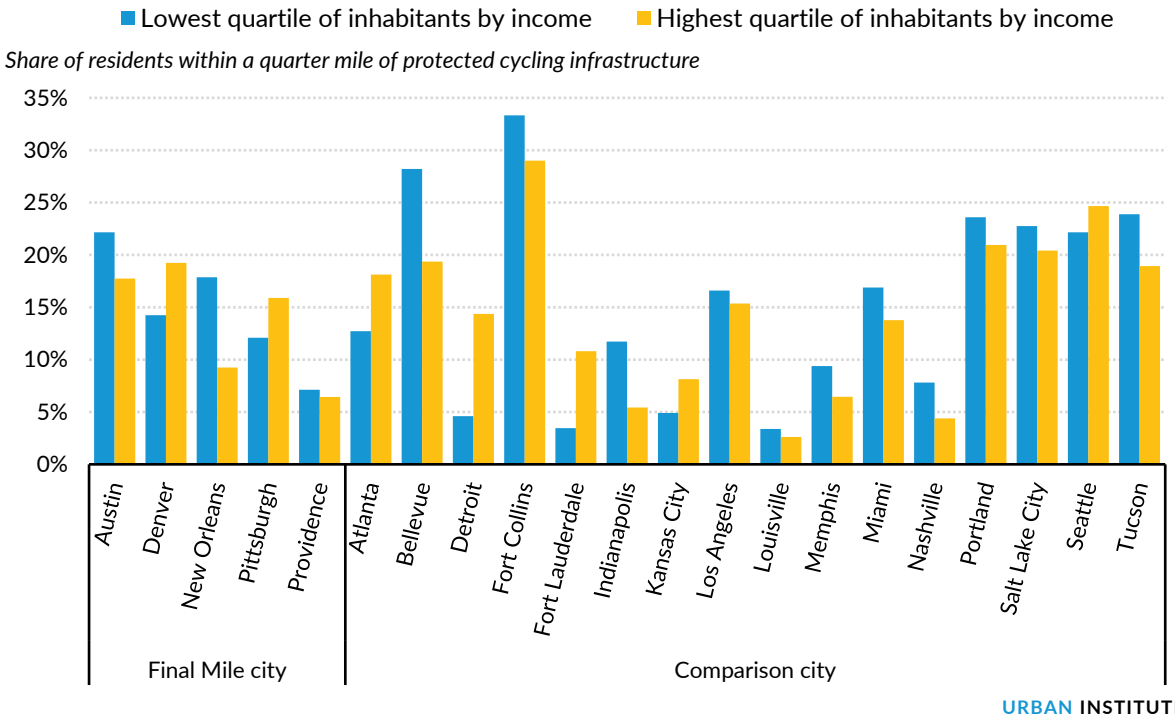


Source: PfB; American Community Survey 2015–2019.
Notes: Data from 2021, based on modified OpenStreetMap data from PfB.

We also measured access to secure cycling facilities against resident incomes. Our goal was to establish whether the network as completed is better serving people who have low incomes and who are more likely to benefit from affordable, accessible, and safe cycling infrastructure—or better serving people with higher incomes. To examine these data, we plotted the location of households by income using Census data at the block group level, then compared average accessibility for the poorest quartile of inhabitants with the accessibility of the wealthiest quartile (figure 24). These data, like those presented in figures 20 to 23, only include secure bike facilities—and include projects completed during and before the Final Mile program. An example to interpret this figure: in Detroit, about 5 percent of the poorest quartile of residents have access to a secure bike lane, compared to almost 15 percent of the wealthiest quarter.

FIGURE 24

Austin and New Orleans Prioritized Access to Lower-Income Residents; Denver and Pittsburgh Did the Opposite



Source: PfB; American Community Survey 2015–2019.
Notes: Data from 2021, based on modified OpenStreetMap data from PfB.

In 13 of the 21 cities we examined, the inhabitants with the lowest incomes had better access to bike infrastructure than people with the highest incomes. Among the Final Mile cities, Austin, New Orleans, and Providence provided this more equitable distribution of access, whereas Denver and

Pittsburgh provided better access to people with higher incomes. Denver's inequity in access is particularly concerning given the city's high level of investment in new cycling infrastructure, and the associated opportunity to improve access.

These findings may reflect the individual geographies of each city, such as how the population is distributed. One possible explanation is that people of certain backgrounds have better access to bike infrastructure because they live nearer to downtown, on average, than the population as a whole. Nevertheless, our findings show that access to secure cycling facilities is inadequate for all people, and not just in the Final Mile cities. More work is needed to fill this gap.

Indeed, interviewees repeatedly expressed that the processes that produced choices about which facilities should be built were not adequate to ensure more equitable outcomes. A consultant working in Austin said that although equity "has been an element of conversation," the tools used "have been inadequate" to associate the concept of equity with substantial outcomes. An advocate in Pittsburgh recommended specifically that "50 percent of the funding should go to neighborhoods that need it," meaning explicitly focusing investments in communities that had suffered from historic disinvestment. And in New Orleans, a nonprofit organizer emphasized that the city had yet to develop a "clear plan for measuring" equity, even as planning processes "could be dominated by white people with resources" who can influence outcomes.

Conclusions

Our research into the effectiveness of the Final Mile program offers key insight into the impacts of a politically minded, goal-oriented effort to transform municipal investment in cycling infrastructure. The Final Mile program was framed around three primary goals, for which we made several conclusions:

- **First, the program established the importance of setting an initial, ambitious goal for future action**. We find that setting that goal was helpful in shaping municipalities' progress in achieving sustainability goals. The goal served in and of itself as an accountability mechanism to accomplish key objectives.
- **Second, the program promoted the development of a long-term commitment to achieving that goal through a series of mutually reinforcing forms of support and pressure points.** This included communications campaigns and semipermanent alliances built between nonprofit organizations and local governments. While communications campaigns were most effective in producing citywide support for change (e.g., encouraging support for funding cycling programs in Austin), they were not able to fully address continued local opposition to projects, which sometimes discouraged city staff and elected officials from making tough choices like removing parking. And while nonprofits did communicate more often with local governments, they remained frequently concerned that they were being undermined by city staff.
- **Third, the program supported increased local capacity to execute projects**, such as by providing funding for engineering. We find that these efforts were appreciated by local governments, which continuously face staff shortages and inadequate expertise. This support undoubtedly played a role in accelerating plans.

Quantitatively, the program had largely positive outcomes—though there is work to be done to improve its performance. Each of the Final Mile–funded cities achieved its planned mileage goal, with the exception of New Orleans. And all Final Mile cities considerably outperformed comparison cities elsewhere in the country in terms of per-capita investment. That said, the Final Mile cities did not perform remarkably in terms of their allocation of funds to building secure cycling facilities—not a critique of any of the funded cities, but rather a reflection of the broadscale acknowledgment that bike infrastructure needs to be as safe as possible wherever it is completed. The Final Mile cities also did no better than their peers overall in terms of ensuring more equitable access to people of color and poor neighborhoods. In summary, when cities prioritized numerical targets over an emphasis on where in the community they located new investments, they left some people out.

These results broadly reflect the trade-offs of embarking on a distinctively *political* strategy to promote environmental goals. Rather than relying on local bureaucrats to respond positively to the distribution of information about best practices or, in contrast, legislative actors to promote improvements through law, Final Mile asked mayors to take a public—and quantified—stand in favor of bike infrastructure. If they were willing to do so, cities received funds from PfB and Wend for nonprofits, advertisers, and engineers to act as institutional supporters, providing a bevy of external inputs through a variety of advocacy mechanisms. But the funders never financially supported the cities directly, instead asking them to buy in to the program by allocating their own capital funds to the cycling infrastructure needs at hand. This formula appears to have paid off, as mayors largely stuck to the plan, city staff executed it, and the Final Mile cities now have more bike infrastructure than they likely would have without the program.

This formula could be executed in other communities under the right conditions. For instance, philanthropic support could be used as an inducement to encourage accelerated action on the behalf of political officials. Importantly, the Final Mile program did not ask political officials to support projects that they would not endorse publicly. Rather, it asked them to commit to achieving defined outcomes, including via distribution of specific local funds, and then used the means at its disposal to keep them to their word. It is possible to envision similar efforts on behalf of carbon emissions reductions, affordable housing strategies, land-use change, and other issues for which many politicians say they are supportive—but for which success nonetheless faces significant headwinds.

Philanthropic support of the scale that PfB and Wend provided, however, would be difficult to replicate nationwide. More research is needed to identify whether the strategies developed here can be applied with lower funding levels, or perhaps without specific philanthropic funds at all. Moreover, we need more data to identify whether the momentum in investment that we demonstrated is ephemeral in the funded cities or the beginning of a long-term strategy.

We also need more research to understand the ultimate impacts of the programs. Census data about travel to work are useful for understanding just a small share of the overall trips taken by people in every US city. We need detailed information about the degree to which the new protected bike facilities get more people out of their cars. And we need to identify what complementary investments—such as in land-use changes, affordable housing, or municipal improvements like open spaces or gyms—can further support a mode shift in favor of cycling.

Recommendations for Policymakers and Funders

The experience of the Final Mile program offers useful lessons to policymakers and philanthropic funders interested in supporting efforts to expand access to sustainable transportation. In this report, we have documented the effectiveness of the program in supporting a significant expansion in cycling mileage. But we have also highlighted several of the challenges the program has faced in achieving the ensemble of its goals.

Given this experience, policymakers and funders interested in promoting new policies that achieve positive environmental and social goals should consider the following recommendations:

- **Ensure elected officials' buy-in from the start**. PfB and Wend prioritized meetings with mayors and mayor's office staff before agreeing to fund local organizations, ensuring that political support was present for improved cycling projects. This approach helped guarantee that the Final Mile program had a champion and committed local governments to funding cycling investments from the beginning. The idea of expanding local cycling infrastructure thus became a municipal government priority, not just one pushed by advocates. Resident polling that demonstrated support for improvements helped make the case to political officials that their endorsement would reflect citywide views.
- **Commit to ambitious, and quantified, implementation goals**. PfB and Wend staff negotiated with mayor's offices to identify ambitious goals that would dramatically expand the mileage of cycling infrastructure available to residents. These goals, when associated with mayoral support, helped keep city staff on track. The quantified goal made it clear what the city was working toward.
- **Require that implementation goals include metrics related to increasing equity**. Although Final Mile mileage goals were largely effective in encouraging local infrastructure expansion, they did not produce a cycling network that adequately prioritized the needs of people of color or people with low incomes. Philanthropic donors could require the introduction of an equity-focused, quantified goal that could be tracked by city officials and integrated directly into local transportation plans. Cities should also work to expand outreach to people of color as a key element of any mobility improvement plan.
- **Monitor plan implementation closely, with a focus on accountability**. Because the Final Mile program supported project managers in each funded city, those individuals were able to keep advocates and city staff in frequent communication. This ensured that city officials continuously remembered to keep the project on the front burner. The fact that PfB and

Wend threatened to remove funding from local efforts if cities backed away from their implementation goals further solidified this focus on keeping cities accountable to achieving their goals. Because the Final Mile program had not committed funds directly to support infrastructure construction, the program's incentive structure remained purely external in nature, not interfering with the municipal government's autonomy to make decisions.

- **Develop a broad set of mechanisms to engage the public and its leaders**. PfB and Wend emphasized that no one approach would be adequate alone in generating support for new cycling investments. By combining communications with technical assistance and a project manager overseeing city–nonprofit relations, the program held political officials accountable on multiple fronts.
- **Adapt support for needs based on local context**. The Final Mile program provided additional support, in the form of assistance for engineering, to several funded cities. This assistance helped fill a capacity gap. Similar programs should adapt the funding they provide to the specific needs of jurisdictions, serving as a form of essential assistance when local governments face limitations.
- **Experiment with new mechanisms to generate support from NIMBYs**. By funding communications campaigns and expanding outreach, the Final Mile program helped generate—and document—broader public support for cycling infrastructure. But projects continued to face obstacles in the form of neighbors who complained at public meetings and directly to city councilors that they did not want to see their streets change. Funders and policymakers should continue to experiment with new approaches to dilute the power of NIMBYs—or convince them to change their minds.

Appendix A. Semistructured Interview Protocol

Introduction:

[After introducing yourselves and Urban Institute] Thank you for meeting with us today. We have been contracted by PeopleForBikes to evaluate the Final Mile Project. The Final Mile Project focuses on the development of bicycle networks in key cities across the United States—including yours! Currently, we are collecting data for a process study of Final Mile's implementation. We are conducting interviews with people who work on biking and bike infrastructure in your community to learn more about bikes and biking in your community over the past five years. Based on what we learn, we'll prepare a report about the learnings from the Final Mile program. The process study is *not* an evaluation of your work.

Consent:

Before beginning the interview, we want to thank you for coming today. We know that you are busy and we will be as focused as possible. We have many questions and are going to talk to many different people, so please do not feel as though we expect you to be able to answer every question. Your participation in this discussion is voluntary and you may choose to not answer questions you do not wish to or end the interview at any time.

In addition, before we start, I want to let you know that though we take notes and—with your permission—make audio recordings of these interviews, we never share any information that identifies you or any other respondents by name outside of our evaluation team. When we write our reports and discuss our findings, we present aggregated information from across our interviews in your site in order to shield the identities of individual interviewees to the extent possible. However, if you are in a position that makes it so that you are the *only person* who could know a certain piece of information, it is possible someone reading a report might infer the source of the information. We make every effort to avoid this, but you should be aware of the possibility. ***(For group discussions: You should also be aware that what you tell others about our conversation today limits how well we can protect your privacy, so we ask that you refrain from sharing anything we discuss today with others.)*** If you are comfortable, we would also like to record the conversation. The recording is made only for the accuracy of our notes and will be destroyed at the termination of the project.

Do you agree to participate? Are you comfortable with this interview being recorded?

Do you have any questions before we begin?

Interview Questions:

Respondent Background

Please confirm your title, the organization you work with.

Briefly describe what you do.
- How long have you been at your position?

How would you describe your role and responsibilities with regards to biking initiatives in your community? Did those responsibilities change over time?

Do you or your organization have any short-term or long-term goals for your work with biking and bike infrastructure in your community?

What would you say is the current landscape of biking and bike infrastructure in your community?

What role do you see bikes play in your community 10 years from now?

Implementation

Over the past five years or so, have there been any key milestones in biking or bike infrastructure in your community?

From your perspective, how do residents in your community feel about biking?
- Are there any existing formal or informal ways that residents provide feedback about biking in the community?

Have there been any communications or advertising campaigns related to bikes in your community?
- How effective do you think these campaigns were?
  - What factors made these campaigns successful or unsuccessful?
- Do you think they affected how the community feels about bikes?

How well does bike infrastructure operate in your community?
- Has the bike infrastructure in your community changed in the past five years?
  - What led to those changes?

Are there elements of your community's bike infrastructure or bike programming that are different from other cities?
- How do you think these elements affected implementation?
  - Did they help? Did they hurt?

If you could do anything different in your work with biking in your community over the last five years, what would you do differently?

Partnerships

As we mentioned, the Final Mile program has been working in your community to help create connections, spur partnership, provide communications support, and advocate for safe biking in your community. Your answers have really helped us understand how the Final Mile may have played a role in how biking has evolved in your community over the past five years.

Had you heard of the Final Mile program before this interview?
You may have heard of the _____, which is how the program has been named in your community.
    What had you heard about it?

What involvement did you have in the Final Mile program?

Who are some of the key players in bike infrastructure implementation in your community?

Did you interact with other partner organizations or advocates working on biking issues?
    Which partners did you work with? What was the nature of that partnership?
    How has the relationship with partners changed over time?
        What led to those changes?

If they are an advocate Did you collaborate with city staff working on biking?
    What was the nature of your relationship with city staff who work on biking?
    What worked well and what didn't work well in your relationship with city staff?
        Did your relationship with city staff change over time?

What parts of your relationship with collaborators in the advocacy space or city government were the most successful?

What parts of your relationship with other collaborators in the advocacy space or city government were challenging?

Are there any partnerships that don't exist right now that would help accomplish your goals?

Outcomes

Did you or your organization have any specific goals for bicycling in your community over the past five years?
    Did you hit those goals?
        What factors affected your ability to hit those goals?
    What else do you and the community need to reach these goals?

In the last five years or so, did you track any specific outcomes of interest for biking in your community?

- Examples: length of bike paths, ridership rates
- Were you able to hit your targets?
  - What helped you hit these targets?
  - What kept you from hitting those targets?

Have there been any physical changes or improvements to bicycle infrastructure in your community in the past five years?

- If so, what changed and how did these changes come about?

Do you think resident sentiment about biking and bike infrastructure in the community has changed over the past five years? If so, what contributed to those shifts?

Have your relationships with other stakeholders, advocates, and city staff in the sector changed over the past five years?

- If so, how did the relationships change and what factors went into it?
  - Do you think these connections will last in the future?

Wrap Up

What, if anything, has gone well with your work on biking over the past five years?

- What factors contributed to these successes?

What, if anything, was challenging about your work on biking over the past five years?

- What factors contributed to these challenges?

[Re-introduce Final Mile] Is there any information you think would be useful to you or other people implementing a program like the Final Mile in the future?

- What do you wish you knew when you started?

Are there any improvements to the Final Mile program that you would recommend?

Is there anything we haven't discussed related to the Final Mile program or biking in your community generally that we should understand?

Is there anyone else who works on biking in your community that you think we should contact?

Notes

[1] "Sources of Greenhouse Gas Emissions," US Environmental Protection Agency, last updated July 27, 2021, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions.

[2] Yonah Freemark, "Transport Databook," 2021, https://www.thetransportpolitic.com/databook.

[3] It is worth noting that people with low incomes often cannot substitute biking trips for car commutes, simply because of the long distances they must travel from home to work. As such, cities focused on equity likely also need to invest in improved transit and sometimes access to automobiles (see Pendall, Blumenberg, and Dawkins 2016).

[4] Final Mile builds on several other projects, including the Green Line Project (2012) and Big Jump (2016), both also coordinated by PfB.

[5] The word sharrow is a portmanteau between "share" and "arrow," invented by the San Francisco Municipal Transportation Agency. "How the SFMTA Invented – and Named – the Bike 'Sharrow'." San Francisco Municipal Transportation Agency, accessed January 3, 2022. https://www.sfmta.com/blog/how-sfmta-invented-and-named-bike-sharrow

[6] These jurisdictions were Ada County, ID; Anchorage, AK; Ann Arbor, MI; Atlanta; Auburn-Opelika Metropolitan Area, AL; Austin; Baldwin Park, CA; Baltimore; Baton Rouge, LA; Bellevue, WA; Benton and Washington Counties, AR; Bloomington, IN; Brockton, MA; Brownsville, TX; Buffalo; Camden, NJ; Carmel, IN; Charlotte; Colorado Springs; Culver City, CA; Denver; Detroit; Doral, FL; Durham, NC; East Palo Alto, CA; El Paso; Euclid, OH; Fort Collins, CO; Fort Worth; Fremont, CA; Holland, MI; Honolulu; Huntsville, AL; Indianapolis; Kansas City, MO; Keene, NH; Key West, FL; Kingston, NY; Kirkland, WA; Lafayette, LA; Lancaster, PA; Lincoln, NE; Los Angeles; Louisville; Lynnwood, WA; Macon-Bibb County, GA; Memphis; Miami; Miami-Dade County, FL; Minneapolis; Montgomery County, MD; Mount Vernon, NY; Nashville, TN; New Haven, CT; New London, CT; New Orleans; New Ulm, MN; Newark; Newport, RI; Oakland; Pittsburgh; Portland, OR; Providence; Queens County, NY (part of New York City); Redlands, CA; Richmond, CA; Richmond, VA; Rochester, NY; Salem, OR; Salt Lake City; San Antonio; San Diego; Santa Monica; Seattle; Spokane, WA; Tacoma, WA; Topeka; Tucson; Tulsa; Urbana, IL; West Palm Beach, FL.

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[13] Jennifer Campbell-Hicks, "Denver Transportation Bond Headed for Approval," *9News*, November 3, 2021, https://www.9news.com/article/news/politics/elections/colorado-election-denver-2c-results/73-e09fcfcf-e603-4bed-8dd7-ffe7b95fb66e.

[14] "About the Office of Transportation," City of New Orleans, Office of Transportation, last updated April 15, 2021, https://www.nola.gov/transportation/about-the-office/.

[15] "Moving New Orleans," City of New Orleans, Office of Transportation, last updated October 4, 2021, https://www.nola.gov/transportation/.

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[18] "Great Streets," City of Providence, accessed September 20, 2021, https://www.providenceri.gov/planning/great-streets/.

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About the Authors

Yonah Freemark is a senior research associate in the Metropolitan Housing and Communities Policy Center at the Urban Institute. He holds a PhD in urban studies from the Massachusetts Institute of Technology and conducts research on land use, housing, transportation, and urban politics.

Yipeng Su is a research associate in the Metropolitan Housing and Communities Policy Center. Her research interests include housing, economic development, and the intersection between urban planning and technology. She holds a master's degree in public administration from New York University's Wagner Graduate School of Public Service.

Wilton Oliver is a former research analyst in the Metropolitan Housing and Communities Policy Center at the Urban Institute. His areas of interest include community development, economic mobility, and racial inequality within cities.

Olivia Fiol is a research analyst in the Metropolitan Housing and Communities Policy Center at the Urban Institute. Her research interests include public transportation, economic mobility, and food security.

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