Issue 6 - Fall 2020

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Editor's Note

Michael Manville, Editor-in-Chief

This issue of Transfers Magazine touches on some of the most important issues that we as a society face: how to attain more equality, and do less environmental harm. Our writers deliver essays about efforts to encourage cleaner vehicles and cleaner trips, to make cities more accessible to people without cars, to distribute the burden of e-commerce more evenly, and to prioritize the most vulnerable residents when we make transportation improvements. These are all topics of undeniable importance.

What makes these Transfers articles, however, is less the urgency of the subjects and more what the authors bring to them: a commitment to clarity, reason and evidence. Transfers is premised on the idea that solutions do exist to our problems, and that careful research, translated into respectful and generous prose, can help us find those solutions and usher them toward reality.

Prose is respectful and generous when it is clear: when it neither talks down to readers nor flies uncaring over their heads.

Academics have too few incentives to produce writing of this sort. Academics write academic articles, and at the risk of sounding cynical, an academic article is done when someone agrees to publish it. A Transfers article is done when almost anyone can read it, understand it, and engage with it. Publication for us is a means to an end, not an end in itself. I thank the writers who have labored to open up their work for a broader audience, and I hope that you (that broader audience) will pay that forward, and strive to make your own arguments with clarity and generosity. The world could use more of both.

Bearing the Brunt of Expanding E-Commerce: Logistics Sprawl, Goods Movement, and Environmental Justice

Quan Yuan

The rapid growth of the logistics industry and online retail in recent decades has substantially increased the volume and frequency of freight flows in U.S. metropolitan areas.

Even before the onset of COVID-19, which has pushed more households to online shopping for everything from basic goods to groceries, logistics and online consumption were growing rapidly. But online consumption has a physical component — warehouses and distribution centers — and those were growing rapidly, too. In the Los Angeles region, for example, the number of warehousing facilities increased 29% from 2003 to 2013, 21% in the San Francisco region, and 79% in the Sacramento region. From 2006 to 2016, employment in the warehousing and storage industry in the United States grew by nearly half. During the same period, retail employment grew only 3%, and manufacturing employment actually fell 13%.

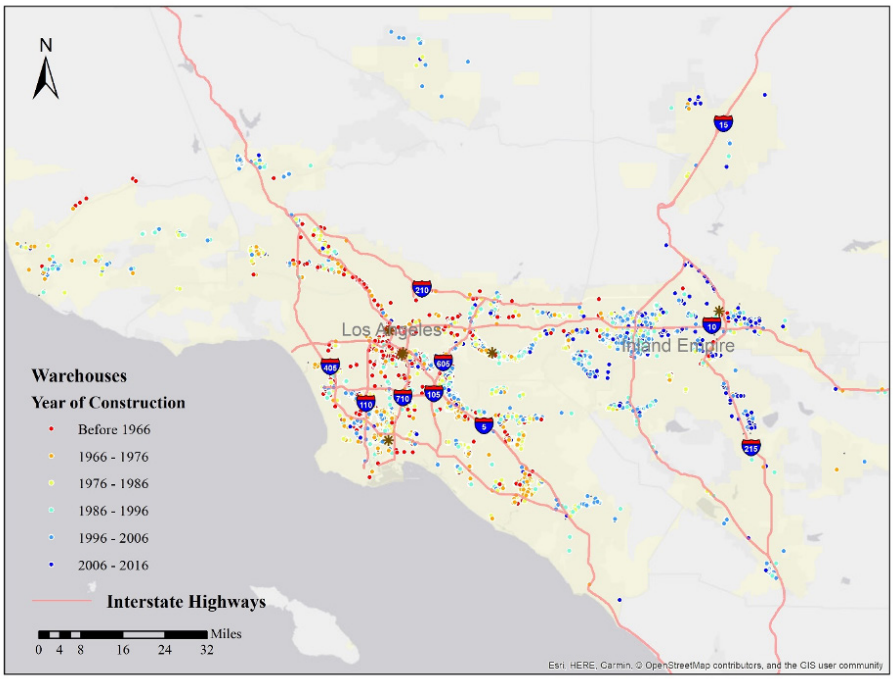
Having goods delivered to your door is convenient. Having the warehouse that holds all those goods down the street from you is less so. The physical location of the online economy matters. Warehouses are associated with noise, pollution, and road damage; the places that hold warehouses bear some costs so the rest of the region can receive benefits. But relatively few studies have examined what kinds of neighborhoods bear these *concentrated* burdens. Mounting evidence suggests, however, that it is neighborhoods with limited economic and political power that are more likely to host these facilities, while better-connected and better-resourced neighborhoods do not.

The Costs of Logistics Sprawl

"Logistics sprawl" — the spread of warehouses and other shipping facilities to suburbs and exurbs — is a little-noticed consequence of the rise of e-commerce. Logistics sprawl is particularly common in gateway metropolitan areas like Los Angeles and Atlanta (see **Figure 1**). It occurs because supply-chain management has evolved in a way that gives warehouse providers greater incentives to consolidate and scale their facilities. As a result, new warehouses and distribution centers are larger and require more land. For example, in Greater Los Angeles, the average rentable area of warehouses built between 2007 to 2017 was 140,000 square feet, more than twice as large as those built earlier. Large lot sizes make central city locations more difficult. Land in cities is scarce and expensive, and the chronic traffic congestion common to urban cores snarls the heavy truck traffic warehouses need. As a result, warehouses sprawl.

The increased presence of warehouses can have major impacts on the suburbs where they arrive. As major intermediate components of supply chains, warehouses generate a lot of truck trips. The average warehouse in the Inland Empire, one of Southern California's suburban warehousing hotspots, generates between 15 and 30 truck trips per day. Larger warehouses

Figure 1. Warehousing facilities by year of construction in the Los Angeles region



Source: Costar Group Inc. (2017)

generate much more. One study suggests that warehouses create 0.33 to 0.66 trips per 1,000 square feet, which means that 500,000-square-foot warehouses popping up on the suburban fringes of many metropolitan areas can produce as many as 300 truck trips per day through adjacent communities.

By one estimate, moreover, large trucks with five or more axles make more than two-thirds of these trips and disproportionately contribute to noise and air pollution. In California, heavy-duty vehicles account for 90% of the diesel particulate (PM10) emissions, 17% of sulfur dioxide (SO2) emissions, and 53% of nitrogen oxide (NOx) emissions from all on-road sources. These emissions can cause myriad health problems. The Environmental Protection Agency has listed more than 40 diesel exhaust components as hazardous air pollutants, many of which increase cancer risk. Public health studies have found relationships between various adverse health outcomes — such as asthma and respiratory allergies — and exposure to PM10, SO2, NOx, and other truck-related emissions, especially in areas with high densities of truck routes.

Apart from air pollution, trucks also damage pavement and increase traffic collisions. They are loud: One truck can generate noise equivalent to 22 automobiles. Large warehouse facilities also have lots of pavement, meaning they tend to absorb heat and deflect rainwater, exacerbating urban heat islands and increasing stormwater runoff.

While some of these costs occur throughout the region, as trucks move from warehouses to urban centers and back, they are costs borne most heavily by adjacent communities. It is thus important to know which communities tend to host these facilities: The location of logistics sprawl has important implications for environmental justice.

What do Neighborhoods Near Warehouses Look Like?

Most neighborhoods do not have warehouses, but a small number of places with warehouses have a lot of them. **Figure 2** shows the distribution of warehouses in Greater Los Angeles, the second-largest metropolitan area and the largest trade gateway in the United States. Most of the region's warehouses are located in a relatively small number of neighborhoods. The region's 5,818 warehouses are unevenly distributed across its 3,775 neighborhoods. While 83% of neighborhoods

Figure 2. Distribution of warehouses in the neighborhoods in the Los Angeles region

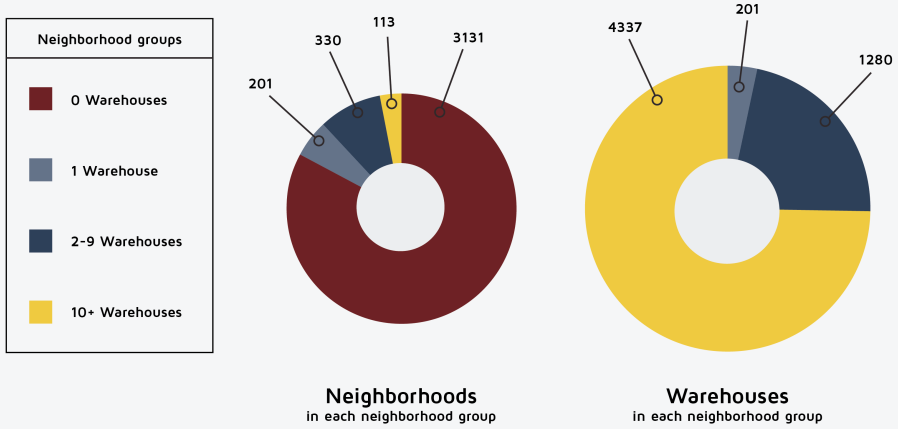
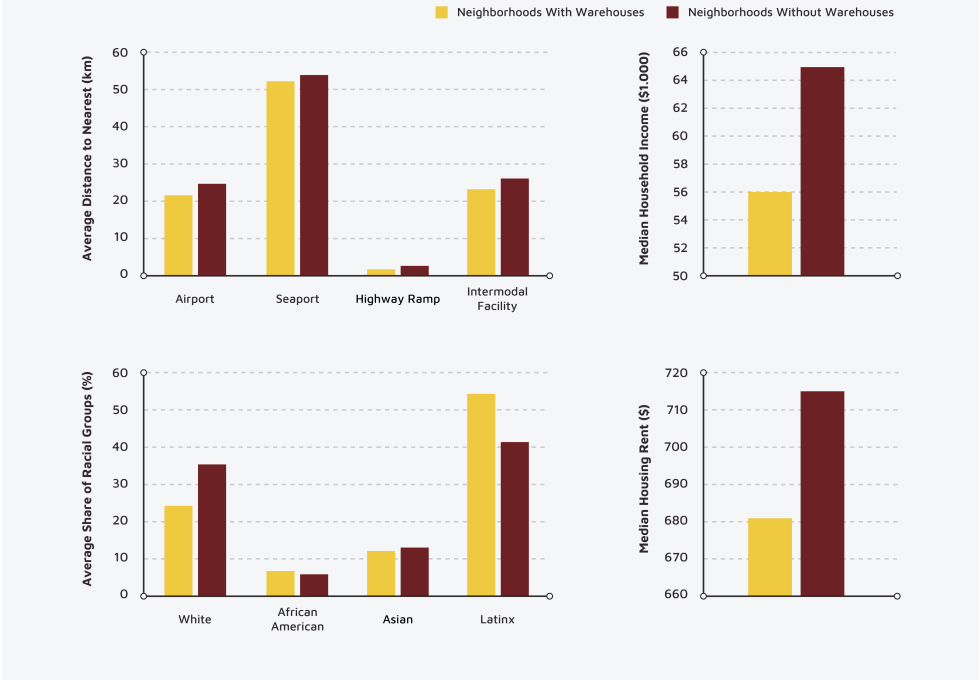


Figure 3. Socioeconomic characteristics of neighborhoods with and without warehouses



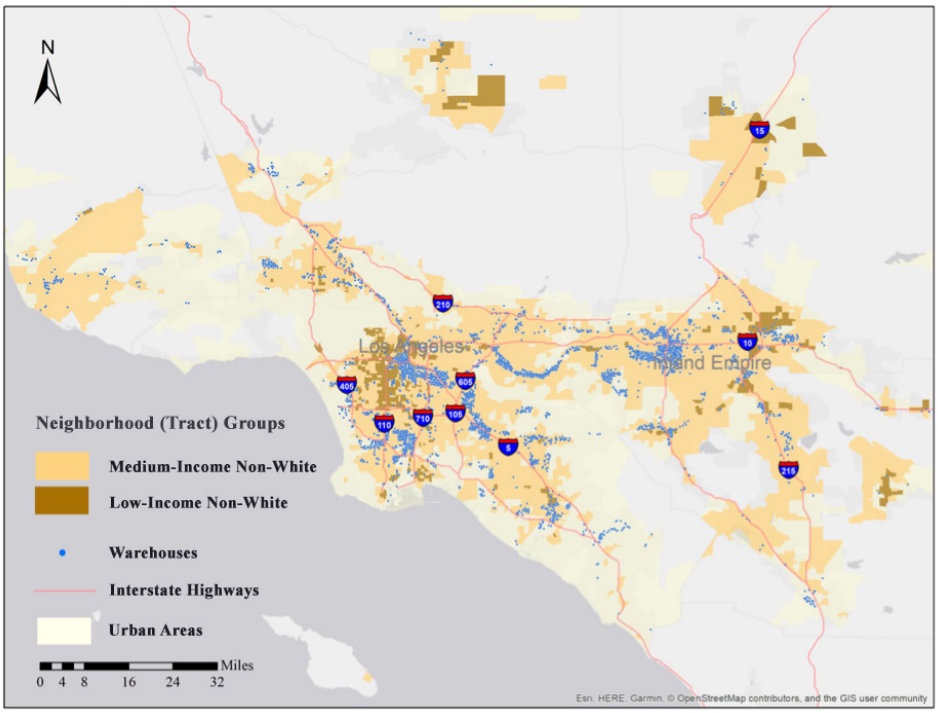
have no warehouses, 3% have at least 10 warehouses. This 3% of LA's neighborhoods house 75% of the region's warehouses.

Figure 3 shows that poorer neighborhoods and those with substantial Latinx populations are more likely to have warehouses, as are places with lower land values and good transportation access

Environmental Inequity in Warehousing Location: A Statistical Analysis

To better understand the relationship between warehouse location and low-income households and communities of color, I divided neighborhoods in Greater Los Angeles into six categories: high-, medium- and low-income white neighborhoods and high-, medium- and low-income neighborhoods of color. I then used statistical analysis to measure the likelihood that these places would host warehousing facilities.

Figure 4. Spatial distribution of warehouses and neighborhoods by income and race/ethnicity



Source: Costar Group Inc. (2017); US Census Bureau (2015)

The results suggest that warehouses are disproportionately located in communities of color, especially in Latino neighborhoods. Both low- and medium-income neighborhoods home to communities of color have significantly more warehouses, and higher concentrations of warehousing space, than do medium-income white neighborhoods (see **Figure 4**). These results are consistent with many previous environmental justice studies, which found that race/ethnicity, not socioeconomic status, is most strongly associated with environmental inequities.

Within neighborhoods of color, medium-income areas are more likely to host warehouses than low-income areas. This finding may be surprising. If lower-income areas have cheaper land than most other neighborhoods, why don't they attract more warehousing facilities than medium-income neighborhoods? One answer is that lower-income areas don't always have lower land values. In Central and South Los Angeles, for example, incomes are low but land values are high — at least relative to land values well outside the city. Low-income people are able to live on this high-value land primarily through density: each household consumes relatively little space. And precisely because land values and density are high, these neighborhoods have few of the large, vacant parcels that today's warehouse developers look for. They also suffer from high levels of traffic congestion.

The medium-income neighborhoods of outlying areas, in contrast, are different. People with slightly more money buy their way out of dense places and purchase more space where land is cheaper. That same abundance of space and cheap land, however, creates a landscape that is appealing to warehouse developers who want large parcels and less congestion. Many middle-income neighborhoods in the Inland Empire offer large parcels, affordable land, good regional access, and favorable local land use policies. These factors mean that they will probably remain popular among warehouse developers in the near future.

Social and institutional factors may also help explain the racial/ethnic inequities in warehouse location. Zoning, in particular, may have a long-term and salient effect on both the distribution of warehousing facilities and the characteristics of the local residents who live near them. For

one, existing industrial zoning tends not to change over time and Greater Los Angeles has a high variation in the amount of land zoned for warehouses. Such historic conditions likely explain why some low-income neighborhoods are largely free from warehouses, while their medium-income neighbors are not.

Finally, warehouses hire mostly blue-collar workers, many of whom live in medium-income neighborhoods. Thus, proximity to labor may be another reason that warehousing developers have chosen to locate in medium-income neighborhoods, and may also explain why some people choose to live near warehouses.

Think Ahead and Take Action

The local impacts of warehousing and logistics are unequally distributed, which raises troubling environmental justice questions. However, local and regional governments have the power to ease this burden off of low-income areas and those that are home to communities of color. Warehouse location is not purely market-driven; both land use path-dependency and local land use and transportation policy exert substantial influence as well. Through land use, building, and environmental regulations, governments can attract or discourage warehouse development. These policies can be used to promote economic growth, and to maintain a fair socioeconomic and racial distribution of that growth's environmental costs.

The varying warehousing burdens across racial/ethnic communities are a regional problem, meaning governments above the local level should be involved in finding solutions. Regional leadership could help local governments develop consistent standards for regulating and mitigating warehousing and logistics-related externalities. State governments and regional planning agencies can track both the environmental impacts of warehousing and logistics activities and the spatial distribution of these impacts. They can also guide local authorities to mitigate these impacts. Officials at all levels of government can help foster better communication among stakeholders to discuss and develop solutions to environmental equity problems. These stakeholders should include not only warehousing and goods movement interests, but also community groups (especially those representing the racial/ethnic and low-income communities disproportionately affected), environmental organizations, and public agencies. Including voices from these underrepresented perspectives in regional logistics policymaking is essential.

While freight hauling is an important part of transportation — and central to the economy — it creates environmental and health problems, and those problems will grow as e-commerce continues to become more widespread. As the popularity of online ordering and other related services continues to grow, transportation and environmental policy must address warehousing and logistics locations and impacts to influence how and where the booming industry grows — and who exactly bears its effects.

This article was adapted from Yuan, Q. (2018). Location of warehouses and environmental justice. Journal of Planning Education and Research, 0739456X18786392.

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How Developers Respond to Parking Reform

C.J. Gabbe, Gregory Pierce, and Gordon Clowers

Most U.S. cities require residential developers to provide one or more parking spaces with each housing unit they build. In many cases, these laws result in more parking than housing consumers want or need. An oversupply of parking can lead directly to higher housing costs, inefficient land uses, and more vehicle ownership and driving. As such, oversupplying parking harms the environment, reduces housing affordability, and thwarts efforts to improve social equity.

Realizing these downsides, a growing number of cities are reforming their parking policies to let developers provide fewer parking spaces. For researchers, an important question is how developers react to these changes: When and where do they provide less parking, when the city gives them the option of doing so? We recently examined this issue in Seattle, after the city reduced its off-street parking minimums. We found that developers built less parking after this zoning reform was enacted. We have reason to think, moreover, that this allowed Seattle to increase its housing production and discourage reliance on automobiles.

Parking Requirements and Land Development

Researchers generally agree that traditional zoning has caused large swaths of urban America to be devoted to parking. What we know less about is how the built environment would look if traditional zoning was changed, and no longer included parking requirements: Would all housing units have less parking, or would we see a wider variety of parking/housing combinations — for instance, some homes with ample parking but also many apartments or townhomes with little or none?

One way to answer this question is to estimate what developers of existing buildings would have done if the zoning requirements didn't exist. Typically, researchers make these estimates by comparing the number of parking spaces on a site to the number the zoning regulations required. If developers build only to the zoning minimum (e.g., they build only one space per unit when the zoning calls for one space per unit), we can infer that, at least in the developers' judgment, there is no demand for additional spaces. We often consider this suggestive evidence that the parking requirements are set too high. If developers try to build *less* than the minimum — by applying for incentives, variances, and other modifications of zoning code minimums, that constitutes even stronger evidence that the parking requirements are set too high. Parking requirements that are too high suggest that

cities are forcing developers to build parking that people don't want, at the cost of housing units that people do want.

Most studies that employ this method of assessing parking requirements find that minimum parking standards constrain development in big cities. But these studies are limited by being counterfactual estimates: We are guessing what would have happened under different zoning. It is preferable to have an actual zoning regulatory change occur, and then observe what happens. Seattle offers an opportunity to do that.

Seattle's Parking Policy Reforms

In 2012, concerns about housing scarcity led Seattle to lower its parking minimum requirements. Doing so was in line with the city's comprehensive plan, and with regional plans that emphasized connecting denser growth centers with more public transit options. Before this reform, Seattle had required residential developments across the city — except for downtown and some special housing types — to provide at least one parking space per housing unit. The 2012 reforms changed this requirement in three big ways. First, the city eliminated all off-street parking requirements for multifamily housing in neighborhoods the city considered "high-density urban centers" (e.g., downtown Seattle, Capitol Hill, South Lake Union, Uptown, and the neighborhoods around the University of Washington). Second, it eliminated multifamily parking requirements in residential and non-residential uses in "medium-density neighborhood centers" (or "urban villages") located within a one-quarter mile of a public transit stop that ran at least every 15 minutes for most of the day. Third, the city reduced parking minimums by 50% along major transit corridors outside these areas, as long as they were within a one-quarter-mile walk of transit stops with frequent service.

In essence, the reforms created three new types of what we call "parking zones" — areas with particular parking requirements. The new parking zones gave us places to observe newly deregulated housing projects and see if developers built less parking. For our analysis, we collected data on all of the 868 residential and mixed-use developments that required a "master use permit" that were approved from June 2012 to October 2017 — this included nearly all of the multifamily and mixed-use developments approved during this period in the city. These projects involved 60,361 housing units and 39,350 associated parking spaces. For each project, we collected data on the number of housing units, the minimum parking required, and the number of spaces developers actually built. We also included data on transit accessibility and other neighborhood characteristics, to control for factors beyond zoning that might influence the provision of parking.

Quantifying Effects of Parking Requirements

The parking zones, and the projects we studied, are shown in **Figure 1**. The brown and yellow shaded areas are the zones, the dots indicate housing projects that were part of the study, and the colors indicate the ratio of housing units to the number of parking spaces actually built. We also show some special housing types, including affordable housing, that were subject to lower parking requirements.

The overarching takeaway is that Seattle's parking reforms significantly reduced parking supply in new buildings. About two-thirds of the projects we examined — mainly those in the downtown and its densest surrounding urban centers — were not required to provide any off-street parking. Most buildings in our sample provided less than one parking space per unit, and a sizable share, nearly 20%, provided no parking at all. **Table 1** shows the distribution of actual parking provided per housing unit post-reforms broken down by minimum parking standard (0, 0.5, and 1 space per housing unit). The average building in areas with reduced parking requirements had 0.91 spaces per unit while those in areas with no parking requirements had 0.49 spaces per unit.

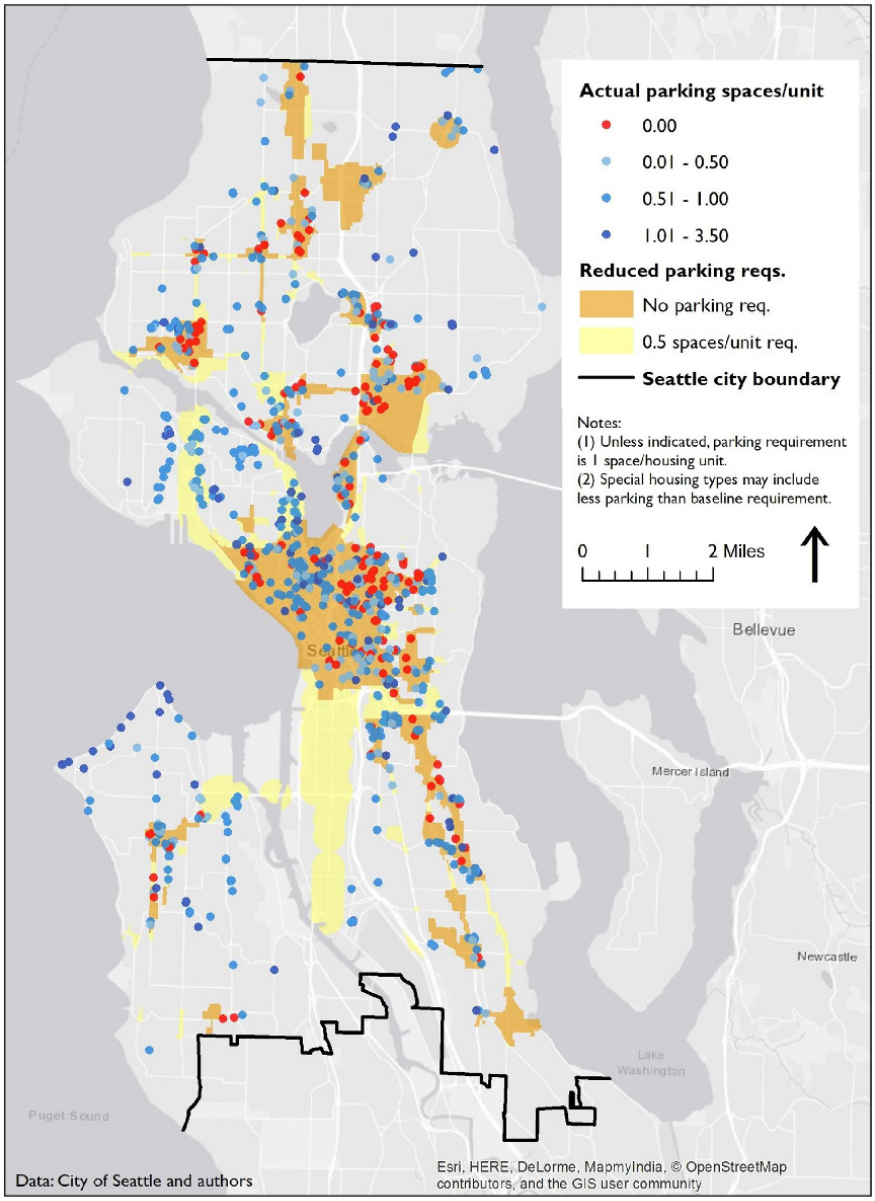

Figure 1. Seattle residential developments in study (2012-2017), with actual and baseline required parking spaces per unit

Lastly, all but one of the 868 developments had less than two parking spaces per unit, a standard that is common (and sometimes required) in other cities.

Most developers closely adhered to the minimum parking requirements. About 34% of the developments included the exact amount of minimum parking required in the code; nearly 30% of the buildings in areas where no parking was required took full advantage of the revised standard (70% provided some parking even here). Demonstrating the effect of the reforms, nearly 88% of buildings in areas where 0.5 spaces per unit were required included less parking than required under the pre-reform standards. In areas where one parking space per unit was required, more than two-thirds of developments included exactly one space per unit, while only one-third exceeded that minimum standard.

When developers did exceed the minimum, they rarely did so by more than one-half space per unit. This was particularly true in areas where the city required 0.5 parking spaces per unit; here, more than three-quarters of developers built between 0.5 and one parking spaces per unit. Overall, about two-thirds of approved projects provided more off-street parking than required by the parking regulations, which suggests that the developers

Minimum Number of Required Parking Spaces/Unit	Number of Development Projects	Average Parking Ratio	Buildings That Exactly Met Requirement	Buildings That Provide Parking Above Requirement		
				<0.5 Spaces/Unit	0.5-1.0 Spaces/Unit	>1.0 Spaces/Unit
0	570 (65.6%)	0.49	29.5%	24.2%	39.0%	7.4%
0.5	130 (15.0%)	0.91	11.5%	76.2%	6.9%	5.4%
1	168 (19.4%)	1.12	67.9%	20.2%	11.9%	0.0%
All	**868**	**0.68**	**34.2%**	**31.2%**	**28.9%**	**5.7%**

Note: Some totals may not add to 100% due to rounding.

Table 1. Relationship between minimum parking required and parking provided in Seattle multifamily developments, 2012-2017

felt the market demanded at least some additional parking. Nevertheless, the revised regulations led to developers supplying fewer spaces than they would have had to under the old regulations.

Our analysis demonstrates the sizable impact of the reforms, which in turn suggests the strong role that minimum parking requirements play in development decisions. In the urban centers, urban villages, and transit-oriented locations, developers built 40% less parking than would otherwise have been required. This reduction translates into almost 18,000 fewer parking spaces across 26,300 units. Assuming each parking space would have cost $30,000 to build, the reform saved $537 million in direct construction costs over five years — more than $20,000 per unit — a savings that likely benefited both housing developers and consumers alike. This figure does not include the opportunity costs associated with having to build parking in spaces that instead could be used for additional housing, as we discuss below.

Multiple factors — not just zoning requirements — influence the number of parking spaces a building provides, so parking reform has different impacts on different kinds of buildings in different areas. A statistical analysis of the data showed that while the parking requirement is the most important predictor of off-street parking, some types of high-end projects still build a lot of parking. This result suggests that developers think high-end developments need ample, or at least enough, parking to be competitive. All else equal, developments in areas with higher land values, and presumably more expensive units, had more parking per unit than others. Mixed-use developments also included more parking than residential developments, to satisfy the parking needs of offices and retail customers.

Implications for Planners and Policymakers

Our results show that (1) minimum parking requirements often constrain developers, and (2) reducing those requirements leads to less parking, which presumably means cost savings for developers and lower housing prices for consumers. These findings highlight the impact that policymakers can have by reducing or eliminating unnecessary off-street parking requirements.

Lowering parking requirements allows developers to forego some construction costs, and likely frees up some physical space to construct more units (although our data could not confirm this). Past scholarship does show, intuitively, that housing with less parking sells at lower prices. Many of Seattle's new housing units would have been more expensive had they included more parking. Excessive parking requirements also represent a lost opportunity for developers, because complying with the requirement means using valuable land or

money for parking (which may not add much to the sale or rental value of each unit), rather than for more profitable housing or commercial uses. If less parking enabled more housing, the additional housing supply may have tempered the overall rise in Seattle's housing prices. In Seattle, the parking reforms (and targeted housing code updates) actually enabled new housing forms. Often, these buildings featured small unit sizes designed efficiently without garage parking to provide more residential units within urban center neighborhoods with small parcel sizes.

Seattle's experience also provides several lessons for other cities about the politics of parking reforms. The city reduced parking standards across all of its growth centers, including transit-oriented neighborhoods, making its parking policy predictable, understandable, and relatively uniform. The city's urban planning staff emphasized to local leaders the importance of a linked land use and transportation regional growth strategy. This type of strategy also has major benefits in achieving more affordable housing nearer to transit, and overcoming the negative effects of automobile reliance on the urban physical environment. These efforts helped temper opposition, and also helped prevent common (and costly) project-by-project debates about parking. Crucially, the city's elected officials successfully communicated the importance of parking reforms to the public through a combination of economic, environmental, and equity arguments.

Our research bolsters the case for reducing or eliminating minimum parking requirements. If cities want to break the cycle of automobile-oriented planning, then reducing or eliminating residential parking requirements is an important step. Doing so will free up space that is better used to create more housing and provide engaging living places rather than storing automobiles. Cities that reduce parking minimums can pave the way for more affordable housing. Our analysis shows that many developers will respond to parking reforms, particularly in neighborhoods with good walkability and transit options. Developers can provide less parking, and at a level that probably better matches market demand than the higher off-street parking requirements adopted decades ago. Policymakers from other cities should, like Seattle, focus their efforts on reducing or eliminating parking minimums.

This article is adapted from Gabbe, C. J., Pierce, G., & Clowers, G. (2020). Parking policy: The effects of residential minimum parking requirements in Seattle. Land Use Policy, 91. https://doi.org/10.1016/j.landusepol.2019.104053

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What's Needed for EVs to Take Off? Learning from Hawaii

Sherilyn Hayashida

In 2010, Tesla introduced a new generation of electric vehicles (EVs) with its Roadster, a luxury-like sports car. To keep up, almost every auto manufacturer has since brought at least one EV model to market. Is this newfound attention on EVs an environmental success story? It could be. EVs are far more energy-efficient than conventional vehicles, and if their electricity is produced from renewable sources, they have the potential to dramatically reduce greenhouse gas (GHG) emissions from the transportation sector.

But EVs in the U.S. to date have not been an unambiguous success, mainly because consumers have been slow to adopt them. Nearly a decade after Tesla's Roadster, EVs are about 2% of new U.S. passenger vehicle sales, and just 1% of passenger vehicles on the road. Some states have more EVs than others, but fewer than 10 states are above the national average. In California, which has the nation's highest EV market share, EVs are about 7% of new passenger vehicles. Moreover, as the transition to renewable electricity has been slow and varied across the U.S., EVs are often GHG-intensive. This has improved though, where based on the average mix of electricity sources in 2019, the average EV emits less GHGs than a fuel-efficient hybrid.

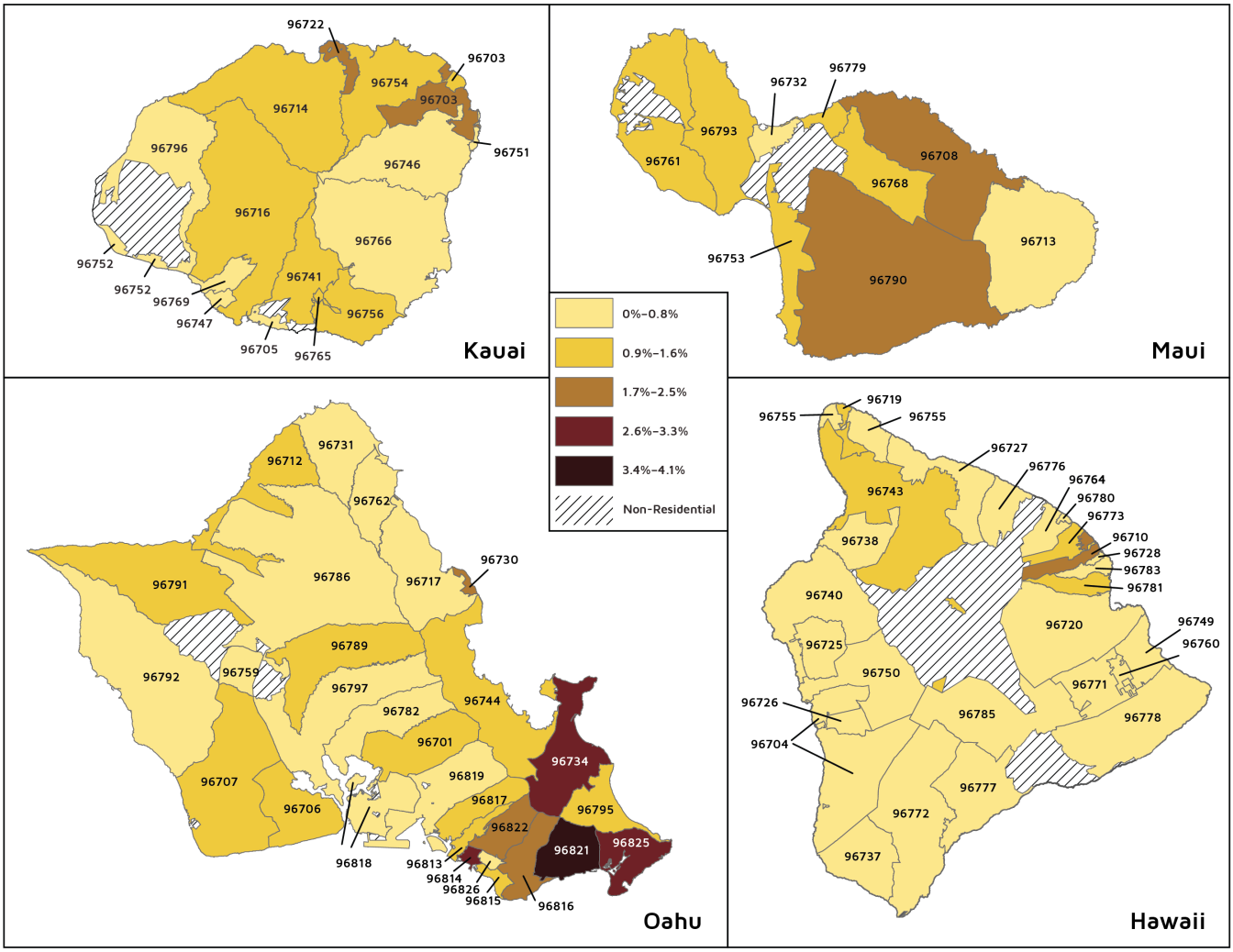
This article tells the story of EV adoption in Hawaii. Hawaii was once considered an ideal place to launch EVs, because of the limited driving range imposed by its island geography. Hawaii's size reduced one of the big tradeoffs inherent in EV ownership — compared to other vehicles, EVs cannot travel as far without having to recharge. In 2010, Hawaii set an ambitious goal of registering 40,000 EVs by 2020. As of August 2020, however, the state had only 12,400 EVs on the road — 1% of the state's passenger vehicles. This disappointing outcome becomes even more so when considering that it makes Hawaii second in per capita EV registrations in the U.S., after California.

Why has Hawaii struggled to get EVs on the road? What worked and what did not? I review some of these lessons below and compare Hawaii to a place — Norway — where EV adoption was much more successful. Norway has managed to dramatically transform its car market: EVs comprise more than 55% of its car sales, and make up about 13% of cars on the road.

EV Adoption in Hawaii

Between 2010 and 2012, Hawaii helped kickstart EV adoption by offering a purchase subsidy of $4,500 and a home charger subsidy of $500. These subsidies were offered on top of existing federal subsidies of up to $7,500 for the purchase or lease of EVs and $1,000 for the purchase of a home charger. Since 1997, EVs had been allowed to park for free at

Figure 1. Share of EV Registrations by ZIP Code, 2018



airports and in most state and county parking lots; this recently sunset at the end of June 2020. Incentives that are still in place today include access to high-occupancy vehicle lanes and a mandate that parking lots with 100 or more stalls be equipped with charging stations though it does not specify the level of charge. Level 1 chargers plug into a standard household outlet and can fully charge an EV in 20 hours. Level 2 chargers require 240-volt outlets but reduce the full charging time to between four and five hours. Level 3 (also referred to as "fast") chargers can charge an EV to 80% of its capacity in 20 minutes. To address the lack of and access to charging infrastructure, in 2019, the state Legislature established a rebate program for upgrading and installing Level 2 and 3 charging stations in the parking lots for multifamily housing and commercial facilities.

Figure 1 shows the 2018 uptake of EVs across Hawaii's heavily populated islands — Oahu, Kauai, Maui and Hawaii. The highest levels of EV adoption by ZIP code are on Oahu, the state's most densely populated island, which is home to over 70% of all registered EVs in Hawaii. In Oahu's urban core, EVs make up between 2% to 4% of registered cars. On Maui, which started developing a Level 3 fast-charging network before the other islands, there are some neighborhoods where about 2% of registered cars are EVs.

What explains the variability in EV adoption? In a statistical analysis that combined vehicle registration and census data, I

found, consistent with many prior studies, that income, education, and gasoline prices were all positively associated with higher EV registrations. I also found that trip duration (the length of the average commute) matters for EV adoption, even on relatively small islands. The ZIP codes with more frequent medium-length commutes (between 20–44 minutes) had higher EV-adoption rates than areas with either shorter or longer commutes. Specifically, a 1% increase in the percentage of households with short commutes was associated with 0.5%–0.7% fewer registrations. Similarly, a 1% increase in the percentage of households with longer commutes was associated with 0.6%–1.2% fewer EV registrations in a ZIP code. The first finding suggests that shorter trips might not merit the upfront investment in EVs, since the primary financial gain is fuel savings. The second finding suggests that even on islands, longer drives might create "range anxiety" — the fear that an electric car won't have enough charge to reach its destination. This latter finding points to the need for a more adequate charging infrastructure network and improved vehicle range.

My analysis also suggests that more, and more powerful, public-charging infrastructure is associated with more EV adoption. Each additional Level 1 or 2 public-charging station in a ZIP code was associated with a 2%–6% increase in EV registrations. In comparison, each additional Level 3 charging station was associated with a 4%–10% increase in EV registrations. This relationship has some "chicken-and-egg" characteristics (in that it isn't clear whether more charging infrastructure leads to more EVs, or vice versa) but it isn't hard to see why charging infrastructure could be important. Though considerably more costly than Level 1 and 2 stations, collective investment in fast-charging infrastructure would address the infrastructure gap, reduce range anxiety and lessen the barrier to adoption by those without access to home charging, mostly those living in multi-unit dwellings.

The top-line takeaway from **Figure 1**, however, is that even places in Hawaii with more EVs still have very few of them, as a share of all vehicles. There are numerous reasons for this. While Hawaii adopted a portfolio of EV incentives, including subsidies for purchase and home-charging subsidies, they were modest at best and only in place for two years. They were also offered as income tax adjustments, meaning that buyers did not save money at the time of purchase, but instead received some money back when they filed their taxes. This characteristic may have made the subsidy less salient to consumers. (The U.S. federal subsidies, similarly, are only available after purchase.)

Norway, in contrast, offers EV incentives that are more numerous, more generous, more immediate, and longer-standing. Norway has offered financial incentives of nearly every type since the mid-1990s and early 2000s. Most notably, Norway exempts battery electric vehicles (those that rely only on electricity, as opposed to plug-in hybrid vehicles that are fueled by a combination of electricity and gasoline) from the high purchase tax it places on new vehicles. This provision makes EVs less expensive than comparative fossil fuel models, and in particular, it makes them less expensive at the point of sale (not after a rebate or tax adjustment that might occur months later). Compared to Hawaii, Norway also invested much earlier in an extensive public-charging network, including Level 3 fast-charging stations.

An additional problem is Hawaii's ambitions are often in tension with U.S. national policy. Compared to Norway, where there is strong national action supporting EVs, the U.S. has no coherent approach to reducing vehicle emissions, and instead suffers from a patchwork of policies. Perhaps the most significant flaw in the U.S. is the Corporate Average Fuel Economy (CAFE) standard. As the standard's name suggests, the U.S. regulates fuel efficiency at the fleet, rather than the vehicle, level — each automaker must attain

a minimum miles-per-gallon standard across all the vehicles it sells. But the fleet average can mask a lot of variance across vehicles, and under this program, an auto manufacturer that sells more EVs perversely earns leeway to sell more gas-guzzling internal combustion vehicles. This contradiction in the program erases some of the environmental gains from EV adoption.

Finally, although not directly related to consumer adoption, Norway's preponderance of clean electricity makes EVs there a more effective way to reduce GHG emissions. Over 96% of Norway's electricity generation comes from hydropower, meaning most EVs involve almost no emissions. Contrast this with Hawaii, where 80% of its electricity generation comes from burning a combination of oil and coal. This makes EVs in Hawaii no better than hybrid vehicles in terms of GHG emissions. As Hawaii works toward its aggressive renewable energy goal of 100% of net electricity sales from renewable sources by 2045, EVs become a promising GHG-abatement strategy. If the state were to reach 40% renewable energy by 2030 (which is roughly 10% more than today), and EVs were charged from rooftop solar panels on just the weekends, then EVs would emit fewer GHG emissions than hybrid vehicles.

Hawaii has made more progress with EV adoption than many other U.S. states, but that progress has still been modest at best. Hawaii's experience, especially compared with that of Norway, shows the importance of strong and sustained policy action, not just in incentivizing EV adoption but also in integrating higher levels of renewable energy and implementing price signals that incent charging during times of high renewable energy production. At the end of the day, for EVs to really take off in the U.S., there must be a robust and coherent *national* policy.

This article is adapted from Hayashida (publishing as Wee) in Wee, S., Coffman, M., & Allen, S. (2020). EV Driver Characteristics: Evidence from Hawaii. Transport Policy, 87, 33-40. https://doi.org/10.1016/j.tranpol.2019.12.006

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Commuter Benefits and Driving: Direct and Spillover Effects

Eun Jin Shin

Commuter benefits are fringe benefits that firms give to workers to reduce the costs of commuting. The most common of these benefits — free parking — probably encourages employees to drive.

In recent years, however, a growing number of state and local governments, such as Washington, D.C. and San Francisco, have passed laws requiring employers of a certain size to offer their employees commuter benefits for alternative modes of transportation (e.g., subsidies for transit or vanpool expenses, or a company-funded bus). These laws primarily aim to address environmental concerns and traffic congestion problems that are especially severe in city centers. These benefits could increase use of these alternative modes, and thereby increase environmental sustainability and social equity.

Despite the growing attention to commuter benefits programs, little is known about their comprehensive effects. Prior investigations have focused only on how benefits influence workers' choice of commuting mode (e.g., does a transit benefit make them less likely to drive, and more likely to ride transit?). It is possible, however, that the effects of commuter benefits can extend beyond commute decisions, and even beyond workers. Benefit programs might influence how workers travel for non-commuting trips, or they might influence how other people in their households decide to travel. But these latter ideas remain largely unexamined.

Motivated by these ideas, my research explored three related questions: (1) Are employer-based commuter benefits associated with workers' commute behavior?; (2) Are commuter benefits associated with workers' non-commute behavior (i.e., is there an individual-level spillover)?; and (3) Are commuter benefits associated with the travel behavior of workers' household members (i.e., is there a household-level spillover)? To answer these questions, I compared the mode choice and vehicle miles traveled (VMT, a measure of total driving) of commute and non-commute trips, for workers who did and did not have their own and other household members' commuter benefits. The area I studied was the central Puget Sound region in Washington state, which includes Seattle and its surrounding areas (King, Pierce, Snohomish, and Kitsap counties).

My data came from the 2014 Puget Sound Regional Travel Survey (PSRTS) that collected information from approximately 12,000 individuals about how the region's residents travel. The survey also collected information on household socioeconomics, and — crucially — on whether commuters were offered any of the following benefits: free/subsidized automobile parking, free/subsidized transit benefits, and commuter benefits other than parking and transit benefits (e.g., subsidies for vanpools, bike storage).

Figure 1 shows that the availability of commuter benefits varied greatly across workers. About one in five workers reported being offered no commuter benefits, and a similar proportion reported being offered all three types. Parking was the dominant commuter benefit provided

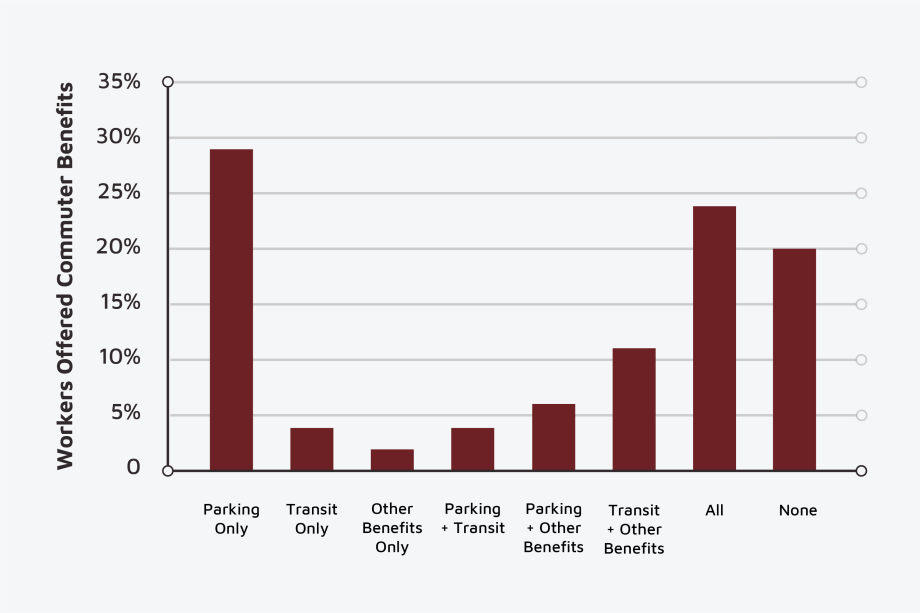

Figure 1. Availability of different types of commuter benefits in the final sample

by employers in the central Puget Sound region. Nearly two-thirds of workers reported being offered parking benefits, whereas fewer than half had access to transit or other benefits. About two-thirds of workers offered transit benefits were also offered parking benefits.

Commuter Benefits and Commuter Choices

My findings support earlier research showing that workers with transit benefits are less likely to drive alone to work. My findings also support earlier research suggesting that workers with parking benefits are *more* likely to drive alone to work. **Figure 2** reports the average changes in the probability of commuting by each transport mode when workers are offered a certain type of commuter benefit. On average, the probability of a worker commuting by transit increases by approximately 11% when that worker is offered transit benefits, whereas it decreases by approximately 8% when the worker is offered parking benefits. Being offered transit benefits also increases the average probability of commuting by carpool or non-motorized transportation, although the magnitude of these effects is much smaller. This is probably because those who do not drive to work can easily choose a different travel mode for each commute trip. For example, even if workers take transit to work to utilize transit benefits, their co-workers could give them a ride home after work or they may walk home for exercise. For those who drive alone to work, however, they are less likely to change their commuting mode after work because they need a car in the morning.

But do these commuter benefits also change workers' *non-commute* travel behavior? My data suggest that answer is yes: both transit and parking benefits influence non-commute travel. They do so, moreover, in the same direction they influence commute travel. In other words, employees with transit benefits drive less, not only for work but also for non-commute purposes. Conversely, those offered parking benefits by employers are more likely to drive for both work and non-work trips.

Why would a commute benefit influence non-commute travel? One possible explanation is that a third of non-work trips still originate from the workplace. People might use their lunch break, for example, to run some errands or go to a medical appointment. It may be most convenient for workers making these trips to use the same mode they used for commuting (e.g., if you drove to work you are more likely to drive if you run out an errand). Similarly, non-commute trips are also frequently linked to commutes: people stop at shops or gyms or schools on the way to or from work. Such trip-

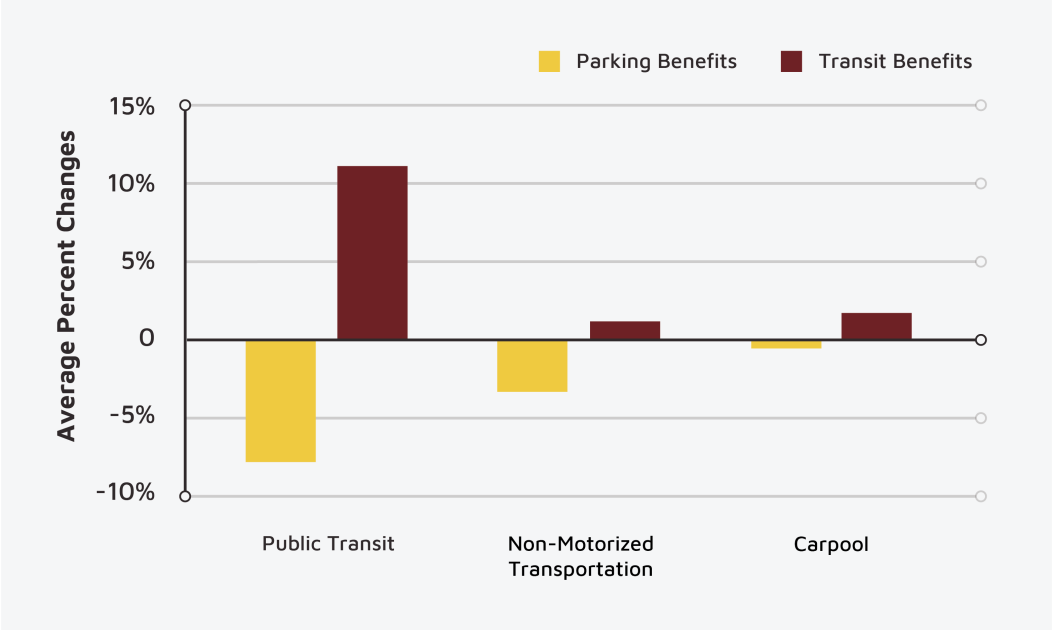

Figure 2. Average changes in the probability of commuting by each transport mode when a worker is offered commuter benefits

chaining is much easier with a car, which may help explain why those offered parking benefits are more likely to drive for non-commute purposes. Finally, workers offered commuter benefits may also cultivate new non-commute travel habits. People who learn the bus or rail system because of a commuter incentive, for example, might realize they can use transit to reach other destinations as well.

Commuter Benefits and Household Members' Travel Behaviors

Commuter benefits are also associated with the travel behaviors of the commuters' household members, but this relationship is more complicated, and in some ways more surprising. Specifically, parking benefits are associated with a decrease in driving distance among commuters' working household members. If a worker has parking benefits, then other members of the household are less likely to drive alone to work, and if they do drive they will drive less. The most likely explanation for this finding is that in a household with less than one vehicle per working household member, workers offered parking benefits seem to have priority access to the household vehicle.

With transit benefits, the behavior of other household members is more straightforward. People who don't work, but who live in a household with someone whose work gives them transit benefits, tend to drive less. This spillover can be partly explained by the fact that workers who are offered transit benefits tend to live in neighborhoods with greater transit access and higher population density, which likely encourages their non-working household members to use transit more and drive less. It may also be explained by learning behavior: people who watch a household member use transit regularly might be more likely to start using it themselves.

At this point, readers might be wondering about the relative magnitude of the different types of spillover and direct effects of commuter benefits: how do they net out? Does a household with parking or transit benefits drive more or less than a household without those benefits? To answer this question, **Table 1** reports the marginal effects — the association of workers' own and other household members' commuter benefits with typical workers' driving distance. For example, offering a transit benefit to the average worker is associated with a decrease in daily driving distance by approximately three miles, about 72% of which is related to commutes.

Table 1 also shows that overall, parking benefits have a positive association with driving. Even though parking's spillover onto other

	Marginal Effect	Commute VMT	Non-Commute VMT
Workers' Own Commuter Benefits	Transit	-2.19	-0.83
	Parking	2.48	0.78
Other Household Members' Commuter Benefits	Transit	NS	NS
	Parking	-0.85	-0.58

Notes: Yellow cells indicate the direct effects of c ommuter benefits. Green cells and blue cells show the individual -level and household-level spillover effects of commuter benefits, respectively. NS means the value is not statistically significant at the 90% confidence level.

Table 1. Marginal effect of commuter benefit programs on worker's VMT

household members is associated with less VMT, that reduced amount of driving is more than outweighed by the increase in driving associated with the commuters themselves. The primary impact of parking benefits appears to be substantially more driving by the person who has them, which leads to more household driving overall.

Key Lessons for Policymakers

In the central Puget Sound region, as in most other U.S. regions, planners tend to evaluate commuter benefit programs by observing the commute behavior of employees. If commuter benefit programs also influence employees' non-commute trips, however, and the trips of other household members, then conventional evaluations might understate their impacts.

Moreover, as the positive association between parking benefits and driving distance remains almost the same after considering the spillovers between commute and non-commute trips and across household members, policymakers should discourage employers from providing parking benefits, or discourage employees from using the parking benefits they are offered. One potential strategy is to require employers to offer a parking cash-out, which is known to significantly reduce solo-driving among workers. For example, in 1992, California enacted a law mandating that some employers give their employees an option of a cash allowance in lieu of parking subsidies, and scholars have demonstrated that this has been effective in discouraging employees from driving to work.

Lastly, but most importantly, because my findings indicate that commuter benefits for transit use are more effective in reducing VMT than previously known, policies are needed to encourage more employers to provide such benefits. More than half of the 2014 Puget Sound survey respondents reported having no access to transit benefits (see **Figure 1**). Therefore, policymakers should develop tools, such as the provision of administrative or financial support, to urge more employers, especially those located in congested areas, to provide transit benefits.

This article is adapted from Shin, E. J. (2020). Commuter benefits programs: Impacts on mode choice, VMT, and spillover effects. Transport Policy, 94, 11-22.

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Paving Equity Into the Streets of Oakland

Ryan Russo

For much of the country, the police killings of George Floyd and Breonna Taylor during a health and economic crisis disproportionately impacting Black, Indigenous, and people of color began a reckoning with long-standing, structural racial inequity in public life and the need for policymakers and government to proactively work to eliminate them. At the City of Oakland and the Oakland Department of Transportation — or OakDOT, as we call it —, we have been centering racial inequity through a structured and strategic approach. We hope to become a model for our profession and cities everywhere.

In the center of the San Francisco Bay Area, Oakland is also at the center of an inequality and housing crisis. White Oaklanders have a life expectancy of more than 81 years; for their Black neighbors, it's less than 73 years. This disparity is the legacy of chattel slavery, Jim Crow, the war on drugs, mass incarceration, unequal public schooling, and biased and unaccountable policing. It was not just these legacies that contributed to systemically unequal outcomes. Our professions of city-building and transportation, unfortunately, also played significant roles — through redlining, suburbanization, urban disinvestment, transit abandonment, liberal use of eminent domain to make way for freeways and urban renewal in Black and brown neighborhoods. East of the San Francisco Bay, the regional Bay Area Rapid Transit (BART) system was built underground in wealthier Berkeley but above ground in North, West and East Oakland, where communities of color were concentrated.

Recently, the Bay Area's failure to build enough housing during a technology-fueled economic boom created an affordability and homelessness crisis disproportionately impacting Oakland and its communities of color. The rent for an average one-bedroom apartment is 29% higher than it was five years ago and home prices have increased by 52% during the same period. The number of homeless people in Oakland jumped 47% in the past two years and about three-quarters of the city's unhoused population are African Americans. This has contributed to a dramatic change in Oakland's demographics.

In 1980, nearly half of Oaklanders were Black. Today this share is closer to one-quarter. For a city that has produced iconic Black athletes and entertainers, bringing African American identity from the margins into the mainstream, this causes anguish. Oakland is rich in racial activism, pride, and progressiveness; a place where movements are made, or find their true voice. The Black Panther Political Party was founded in Oakland, and the Black Lives Matter movement took root here. Oakland is not accepting recent changes and growing disparities without working to combat them.

Creating a Department with Equity in its DNA

It was in this context that OakDOT was launched in 2017. The core premise of the reorganization

that created OakDOT was that managing streets is about more than maintenance, and that transportation is about more than getting vehicles from point A to point B. We recognized the opportunity to help Oaklanders thrive, save them time and money, improve their access to schools and services, grow their economy, strengthen bonds in their community, and keep them safe. As a new department, OakDOT developed its own DNA through an ambitious Strategic Plan that outlined 37 goals being pursued via 98 strategies. At its core are four foundational values: equity, safety, sustainability and trust. However, equity is elevated at OakDOT as not just one of four key values and aspirations, but additionally as a lens through which the other values and aspirations are pursued.

While OakDOT has large aspirations, residents are frustrated that the City has not provided a basic state of good repair and a dignified public realm: long-standing neglect of streets and sidewalks due to a stagnant gas tax and structural local government financial constraints has meant that cracked sidewalks and potholes are the norm. Grandmothers who have lived on the same block their whole lives have never seen their street repaved. OakDOT is changing this thanks to a voter-approved, innovative, and comprehensive local infrastructure bond. Measure KK, approved in 2016, provides $350 million dollars for street and sidewalk improvements along with $150 million for public facilities like parks and libraries and $100 million for affordable housing. Importantly, voters and the Oakland City Council directed that equity be a driving consideration to how city departments allocate these new resources.

A Professional, Systematic Approach to Equity

Oakland is the first city in California to have a Department of Race and Equity, created at roughly the same time as OakDOT. Its mission is to create a city in which diversity has been maintained, racial disparities have been eliminated and racial equity has been achieved. It is training staff in departments throughout the city using proven strategies, including increasing awareness of root causes, cultivating and mobilizing advocates, establishing baseline disparity data, collaborating with communities, and adopting a results-based accountability approach. The work includes OakDOT forming a Racial Equity Team that developed a charter being used to operationalize equity, measure progress, and list specific responsibilities for management and staff. In 2018, the city published the "Oakland Equity Indicators Report" to provide a baseline quantitative framework to better understand the impacts of race, measure inequities, and enable us to monitor

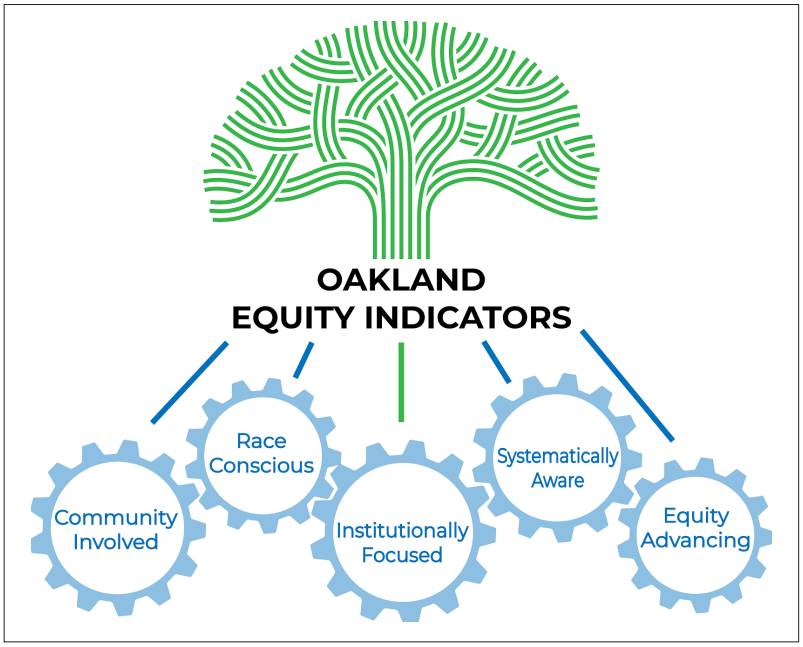

Figure 1. The City of Oakland is using data and an integrated approach to pursuing equity

progress and setbacks. OakDOT is working to reduce inequities by looking at hiring practices, community engagement and planning, cultural expression, and traffic safety.

An OakDOT Racial Equity Team subcommittee is looking closely at how the department is being built. We recognize the need for OakDOT to reflect the diversity of the communities we serve. Hiring rules and typical recruitment practices, governed by civil service and education requirements, can be an impediment to bringing people of color into positions of authority. We have been examining every step of the recruitment process in an effort to expand the range of candidates because a team that reflects the community that we serve will strengthen our capacity to administer equitable services. OakDOT has incorporated an examination of candidates' understanding of structural inequities, along with the value of their lived experience, into its recruitment process. While we have much further to go, this approach is helping OakDOT better reflect the communities we serve and become a time with the capacity and values to address inequity in our daily work.

Fundamental to pursuing equity and working equitably is a new approach to community engagement. OakDOT is meeting communities where they are and focusing on engaging those who have not been heard because of structural challenges to participating in governance. For example, OakDOT is attending existing community events rather than hosting evening public input sessions, it arranges for child care and provides food at community meetings and strategically targets reaching populations that are less likely to participate. To update the bike plan our entire team — including consultants — took racial equity training. We then developed an equity framework, looking through a racial equity lens at existing conditions, project identification, and investment prioritization.

Groups with deep ties to communities of color in Oakland became part of the bike plan project team, each receiving stipends for their time and insights. The team did not shy away from the key issues Oakland is facing to instead talk narrowly about barriers to cycling: We honored Oaklanders' concerns about housing security, displacement, and gentrification; and empowered our community partners to help identify policies, programs, and projects that can deliver mobility resources to communities most impacted by these concerns. The plan, which was approved unanimously by Oakland's Planning Commission and City Council in the summer of 2020, includes innovative proposals like bike repair stations and mechanics at libraries in neighborhoods that lack bike shops. In addition, OakDOT committed to work interdepartmentally to address concerns around housing, development and community policing. Their inclusion and the unanimous adoption of the plan demonstrate the value of genuine community engagement.

Historically disadvantaged communities in Oakland told us that saving time and money in a booming economy with scarce affordable housing was a top priority. One-quarter of African American households do not own a car — about two-and-a-half times the citywide average. That is why we supported emerging mobility like free-floating carshare, bikeshare and shared electric scooters and mopeds. Many Oaklanders now find they need not spend up to $9,000 a year to own a personal vehicle thanks to these services. OakDOT has championed low-income programs and equitable coverage policies to make sure those that most in need are not left out.

OakDOT's Paint the Town! program enhances community members' sense of belonging to their neighborhood. The program gives communities the opportunity to design murals and paint them on the street. It was designed to be as simple as possible and to reduce barriers to entry. Funding from foundations was raised to support high-need communities, and we have approved murals in twice as many communities of concern — areas where disadvantaged populations like severely rent-burdened households, low-income populations, and people of color are concentrated — than in areas that have more resources.

Government's most important responsibility is keeping its communities, especially its most vulnerable members, safe. Unfortunately,

traffic-related severe injuries and fatalities occur most frequently in historically redlined, lower-income neighborhoods where higher proportions of people of color live. We are responding urgently and rapidly to terrible tragedies that happen on streets, to make swift meaningful change where the most horrific injuries occur. At the same time, we are working to innovate with designs and processes that encourage safe choices. For example, in response to a fatal collision in October 2019, OakDOT installed the West Coast's first "Hardened Centerline" — a treatment that puts a rubber speed bump along the centerline of the road projecting into an intersection to slow left-turning vehicles. Data drive actions that prevent future tragedies. The complaint-based systems local governments use can exacerbate structural inequities. In Oakland, neighborhoods having fewer injuries from traffic crashes ask more frequently for traffic safety improvements. To counter this, we developed a model that prioritizes traffic safety requests from places with more injuries, by equally weighting location within a community of concern, the collision history of the street, and proximity to schools.

Budgeting & Paving Equitably

A government's budget is the ultimate expression of its values. Unfortunately, many communities speak about values like equity, but when the time comes to budget they fall back on whatever receives the most vocal advocacy. Oakland updated its process for developing its Capital Improvement Program budget to reflect community values by turning them into a scorecard. OakDOT uses the scorecard to objectively compare and to ensure that investments track to our values.

One notable result of the new approach to capital budgeting is our Three Year Paving plan, adopted last year, the first paving plan in the country to explicitly use equity metrics to direct road repaving resources. Streets in every Oakland neighborhood need repaving. With new funding available, we had to determine which streets in which areas to repave first.

Community members in virtually every neighborhood maintain that their neighborhood streets are the worst in the City. Using objective data sets the record straight. To develop an equity-based paving plan, we analyzed demographic and road condition data for nine separate areas of Oakland. We presented the population, income, and racial and ethnic composition of each area along with the total street mileage including miles in need of repaving and the average condition of streets in that area.

A street in disrepair is unpleasant, bends rims, and breaks vehicle axles, leading to traffic disruptions and personal costs. Equity was a top consideration because the cost of a damaged vehicle, for a household paying 50%

Figure 2. Streets in East Oakland that have not been paved in generations are being resurfaced as part of the equity-driven three-year plan

or more of its income in rent, is high: it can mean losing a job, missing a rent payment, and possibly eviction and homelessness. An affluent household, in contrast, is still inconvenienced by a damaged vehicle, but may have access to additional vehicles, is likely engaged in white-collar employment where lateness won't cause job loss, and is not in a situation where the family will miss a mortgage payment if they have to pay for vehicle repair.

Our analysis allowed the public to have a common baseline of existing conditions; its conclusions were surprising to many. For example, few residents and policymakers knew that the North Oakland Hills, a community that wields great political influence, only has about 24,000 residents (6% of the entire city), 69% of whom are white, with a median household income of $158,000. Because the area is by low density, we maintain 110 miles of streets (13% of the city's total) where there are only 379 people per mile of street in need of repaving. By comparison, East Oakland, where the most redlined areas were located, is home to 99,000 residents (24% of the city) of whom 93% are people of color living in households with a median income of $43,000. A much higher density area, it has 165 miles of streets (20% of total) and 1,400 residents for every mile of street in need of repaving.

These data make clear that East Oakland warrants more paving investment. This contrasts with the long-standing perception that the North Oakland Hills had the worst streets and was most deserving of investment that clearly resulted from those community members' vigorous engagement in discussions of the issue of road conditions.

The data were used to craft a funding proposal. The proposal showed two simple metrics by area of the city — the share of local streets in need of repaving, and the share of underserved population. We weighed those equally, averaging the two metrics to create the proposed share of local street paving resources for that area. East Oakland is home to 29% of the population with disadvantages and 18% of the local streets in poor or failing condition. So the plan proposed to direct 24% of the paving resources (the average of 18 and 29) to East Oakland. By contrast, the North Oakland Hills has 16% of the road mileage in need of repaving and just 2% of the population with disadvantages; therefore, the plan proposed that 9% of local street paving dollars be spent in that area.

It was important that Oaklanders understood our proposed approach prior to bringing it to the City Council for consideration. Meetings were held throughout the city at which OakDOT explained the proposal. Unsurprisingly, explaining the proposal to residents of the North Oakland Hills proved challenging. Headlines in the *San Francisco Chronicle* exclaimed "Oakland hills residents break an axle over city's $100 million pothole plan" (internet) and "Bumpy rollout of plan to fix Oakland's streets." Despite the headlines, however, many community members understood and ultimately supported the rationale.

A deeper examination of the plan ultimately led to enough citywide support for it to pass the Oakland City Council unanimously, and this in turn led to more positive headlines in the *Chronicle*: "Oakland pothole plan paves path to equity for lower-income areas." Innovation in planning and budgeting has attracted national attention. The public radio program "Marketplace" featured the plan in a segment titled: "One way Oakland is fighting racial inequality? By fixing potholes." Now, crews are in the field in areas like East Oakland repaving local streets, and grandmothers who've been there for 80 years or more are saying thank you.

Paving the Way for a National Movement Towards Equity

OakDOT's approach to equity has helped it serve the communities hit most significantly by the COVID-19 pandemic. Just a few weeks into shelter-in-place orders, OakDOT initiated the Oakland Slow Streets program, which for significant street segments invited non-motorized street users off of the sidewalks and into the roadbed while restricting motor vehicle traffic to only local trips. The purpose was to provide the road area for non-motorized users to safely move and maintain physical

distance. While popular in wealthier, whiter neighborhoods in Oakland, we quickly heard from partners in communities that have been victims of structural inequality, that the initiative was not meeting their needs. Specifically, many in these communities were not telecommuting and were essential workers still traveling to workplaces. A more pressing concern was traffic that was speeding near essential services and workplaces like grocery stores. Hearing this feedback, OakDOT made several adjustments to the program, including the development of Oakland Slow Streets: Essential Places, which installs rapid, low-cost pedestrian crossing improvements to locations in priority neighborhoods where people were still traveling to during shelter-in-place like grocery stores.

The COVID-19 pandemic and the movement for social justice in response to police killings of Black people have highlighted that government needs both a humble and intentional approach to truly begin to reverse long-standing structural inequities. We will realize equity when identity and location cannot predict outcomes. Unfortunately, almost every indicator of well-being shows troubling disparities by race and place. OakDOT is committed to achieving equity using a systematic and professional approach. Authentic community engagement and transparent, data-driven decision-making need wider adoption. Cities nationwide are learning from our approach — in turn, better serving their own communities. Combating racism and inequality may not seem related to potholes, but Oakland is showing that in a significant way, they absolutely intersect.

This article is adapted from a presentation given by the author during the 2019 UCLA Lake Arrowhead Symposium.

About the Author

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Further Reading

Oakland Equity Indicators

Toole Design Group's Equity Resource Guide, by Tamika Butler, Esq.

Oakland Department of Transportation Strategic Plan & Updates

How Oakland Got Real About Equitable Urban Planning

Opinion: The Problem with Drive-In Services — Now and After COVID-19

Madeline Brozen

In response to the health risks of COVID-19, states are restricting indoor activities and the size of group gatherings. Businesses must rethink how they offer their services. Social service agencies and schools must also adapt in how they get food to people who rely on food banks and free and reduced-priced school lunches. Many are turning, as a solution, to two classic American inventions: the drive-in and the drive-thru.

In the early 1930s, Richard Hollingshed invented the drive-in movie theater from his home in New Jersey. Hollingshed thought drive-ins would bring movies to a broader audience, by overcoming the obstacles that prevented many people from going to theaters: needing childcare, difficulty parking, small and uncomfortable theatre seats.

In 1948, right around the time drive-in movies reached their peak popularity, Harry Snyder invented the drive-thru restaurant, with his first In-N-Out Burger. At this point people were already eating at drive-*in* cafes; what Snyder invented was a two-way intercom that let people order their food without leaving their cars.

Given the convenience and privacy of the automobile, it is no surprise that drive-ins and drive-thrus have surged during COVID-19. This fall, people could traverse spooky Halloween drive-thru trails, visit drive-thru pet sanctuaries, and view entire independent film festivals from their cars. Governments and healthcare providers, meanwhile, are offering drive-thru food distribution, COVID-19 testing, and flu shots.

The problem with all of these drive-thru innovations is implied in their name: you can't take advantage of them if you can't drive. Without a car, you can't see the elaborately carved pumpkins, smile at the rescue cow, or enjoy most outdoor movies. There are worse things, of course, than being denied access to a drive-thru burger, or to an Instagrammable haunted Halloween drive-thru. But it is much more concerning if you can't get food from the food bank, or know if you have tested positive for COVID-19.

In the United States, a nation built in many ways for people with cars, people without cars face large barriers to opportunity. They can reach fewer job opportunities within a reasonable amount of time. They have trouble getting to healthcare. Those who are parents have a harder time getting their children to after-school activities, key to childhood development — and fun. For those without cars, the everyday mobility that many take

Common as car ownership may be, it shouldn't be a prerequisite for full participation in U.S. society. When people open their eyes and see that something only for cars is a serious equity access problem, easy solutions abound.

for granted is a constant negotiation, one that involves cobbling together walking, transit, and rides in the cars of friends and family.

Nor are these obstacles distributed equally across the population. Over 10 million American households do not own a car, but carless households are twice as likely to be made up of people of color, with Black households having the lowest ownership rates. Because of these racial and socioeconomic disparities, drive-in and drive-thru systems are intrinsically exclusionary, and disproportionately harm Black people, poor people, older adults, people with disabilities, and recent immigrants.

Precisely because drive-thrus encourage and require driving and automobile-oriented design, some cities, before COVID-19 struck, were taking steps away from them. Minneapolis, for example, prohibited the opening of new drive-thru facilities after 2019, saying they were inconsistent with the city's long-term plans to reduce greenhouse gas emissions. A handful of other cities in California, Montana, and New Jersey have instituted their own temporary or permanent bans too.

COVID-19 sent cities back in the other direction, furthering existing inequalities. In a time of emergency, businesses or social service agencies have largely failed to put together non-car options — even when many of the people most vulnerable to COVID are also more likely to lack cars.

This problem doesn't need to exist. It isn't hard to increase accessibility of drive-thru services for those without cars. For example, when Minneapolis was banning new drive-thrus, Portland was working to increase access to theirs. In their zoning code, Portland required that drive-thru businesses also serve people outside of cars. By simply adding one sentence to its zoning code, the city ensured no one would be excluded from basic services.

In the COVID-19 era, the same principle holds. Simple design approaches and health protocols could make drive-in and drive-thru experiences safely accommodate people outside of their vehicles. To the extent that people are diligent about wearing masks and keeping distance, showing up without a car is not likely a significantly greater safety concern. Using pre-marked spaces, or parking spaces themselves, could help ensure that people outside vehicles stay far enough apart.

Common as car ownership may be, it shouldn't be a prerequisite for full participation in U.S. society. When people open their eyes and see that something only for cars is a serious equity access problem, easy solutions abound.

About the Author

Madeline Brozen is the deputy director of the UCLA Lewis Center for Regional Policy Studies. Her research focuses on the transportation and mobility needs for vulnerable groups of people and is the founding editor-in-chief of Transfers Magazine.