RESEARCH REPORT

The Road to School

How Far Students Travel to School in the Choice-Rich Cities of Denver, Detroit, New Orleans, New York City, and Washington, DC

Urban Institute Student Transportation Working Group

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 Cover photo by Lydia Thompson/Urban Institute. Skyler Clay, a ninth-grader at School Without Walls in the Foggy Bottom neighborhood of Washington, DC, walks to class after her 30-minute commute on the public bus.

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Executive Summary

How to get to school is an important issue for families who want to send their children to schools outside their neighborhood and for education policymakers seeking to implement school choice policies that mitigate rather than exacerbate educational inequality.

We analyze travel times between the homes and schools of nearly 190,000 students across five large US cities that offer a significant amount of educational choice: Denver, Detroit, New Orleans, New York City, and Washington, DC.

Key findings, which both confirm and question conventional wisdom, include the following:

- Most students in our cities do not live farther than about a 20-minute drive from home to school, but travel patterns vary across age and demographic groups.
- The distance that students travel (as measured in driving time) appears to vary more by grade than by city, despite wide variation across cities in student transportation policy, public transit availability, geography, and school choice policies. Older students travel farther to school than younger students, and black students travel farther than white or Hispanic students. However, the small proportion of students who are not low income tend to travel slightly farther than their more numerous low-income peers.
- Although many perceive enrollment in a charter school as opting into a school farther from home, this is not universally true. Particularly among older students, those enrolled in traditional public schools tend to travel as far, or in some cases farther, than those attending charter schools. These differences across demographics and school types may reflect differences in family preferences for nonneighborhood schools, as well as differences in school siting decisions and transportation policies for different types of schools.
- Access to "high quality" high schools varies across cities, race and ethnicity, and on the quality measure used. However, ninth-grade students, on average, tend to live about a 10-minute drive from a "high quality" high school.
- Access to a car can significantly increase the number of schools available to a family. Typical travel times to school by public transit are significantly greater than by car, especially in cities with less efficient transit networks. As a result, a student whose parents can drive her 15

minutes to school has more schools to choose from than a student considering the same commute on public transit. According to US Census data, disadvantaged households are less likely to have access to a car, although this varies widely by city.

Where students live relative to the schools they attend is only one important consideration in a well-functioning school choice system. Other factors that affect equitable access could include how families are informed of their school choice options, policies such as centralized lotteries that allocate students to schools, and the capacity of high-performing schools to expand to meet demand. No single factor is decisive on its own, but ensuring that students can reliably travel to a school is a critical factor in making a choice in theory a choice in reality.

The Road to School

Families in many cities now have a great deal of choice about where to send their children to school, at least on paper. Although a neighborhood school is still usually an option, families can increasingly opt into a traditional public school in a different neighborhood, a charter school, a magnet school, or even a private school. In 2012, 37 percent of all parents indicated that they had a choice of public school options, and 49 percent of those in cities reported having public school choice.[1]

But for these other school options to be feasible choices for families, parents must be able to get their children to the school. For a parent with a car and flexible schedule, this may not be an issue. But for many working parents or for those who do not have access to a reliable form of transportation, it could be a challenge to consistently get students to school on time.

Cities vary widely in the assistance they provide to parents who send their children to nonneighborhood schools. For example, New Orleans requires nearly all schools to provide bus service to students who live at least a mile away. Washington, DC, provides free public transit to all students but does not provide school buses for regular-education students. Denver has a school bus system, where charter school students have access to district buses in designated neighborhoods, and other charter schools contract with the system for bus access (students who are not served receive transit passes instead).

How choice-rich urban education systems confront the trade-offs between the costs and benefits of different student transportation policies may have implications for whether their policies provide more equitable access to education by increasing the choices available to students. But there is little research that looks at the distance between where children live and where they go to school, and existing research tends to focus on individual cities (Denice and Gross 2016).

In this report, we examine the relationship between where students live, where they go to school, and the availability of other school options in five cities with a high degree of school choice: Denver, Detroit, New Orleans, New York City, and Washington, DC. We examine how far different students travel to get to school, how long it would take them to make the trip by car or public transit, and how travel patterns vary across cities, grade levels, and demographic groups.

Our report reveals new information about the pattern of student travel in these cities. This analysis provides policymakers and advocates with the opportunity to understand which students in their communities are traveling the farthest to attend school, and how resources such as family income,

availability of nearby schools, and school district and city transportation policy may affect how far students travel.

Why Student Travel Matters

A student's trip to school can affect more than whether they can access a desired school. The time that the trip takes and the quality of the trip could also impact a student's academic outcomes and engagement. A long commute to school might affect a student's ability to get to school on time, her number of absences, and her availability to participate in before- or after-school activities (Blackmon and Cain 2015; Canfield et al. 2016; Grossman, Walker, and Raley 2001; Teasley 2004).

Families generally value a school that is convenient, all else equal. A study of school lottery choices in Washington, DC, found that a typical middle school parent would be willing to send their child to a school with lower test scores if it were closer (Glazerman and Dotter 2017). In a recent survey of 8 cities, 60–72 percent of parents reported that an adult in the household was responsible for getting their child to school (Jochim et al. 2014).

The use of school-provided transportation (typically yellow bus service) is often the easiest option for families but may bring logistical challenges for schools and districts. For example, school-provided transportation could limit available school starting times because of the constraints of bus availability and route length. School start times have been shown to have an impact on student achievement, and older students, who are often assigned the earliest start times, tend to benefit the most from a later start (Carrell, Maghakian, and West 2011; Wolfson et al. 2007). Changing district bus schedules to give older students a later start time is one relatively low-cost solution (Wahistrom 2002). But transportation changes, particularly to bus schedules, may be accompanied by an increase in costs and pushback from families (Edwards 2012; Jacob and Rockoff 2011).[2]

Patterns of school quality, distance to school, and transportation availability also vary by race, ethnicity, and income. An analysis of students entering high school in Chicago showed that students from affluent neighborhoods were more likely to attend school close to home, but students from low-income neighborhoods were more likely to travel farther and were 35 percent more likely to be the only student from their neighborhood at a given school (Burdick-Will 2015). In Denver, black families were more likely to apply to a distant, "high quality" school than Hispanic or white families (Denice and Gross 2016).

The Landscape of Education in Cities with School Choice

All five cities in our study have substantially increased the choices available to their students. Students in these cities can enroll in nonneighborhood schools (traditional, magnet, and charter), and may also have access to outside options through private-school scholarship programs and interdistrict choice. We document how choice-oriented education policies have evolved in each city over the last few decades and how the number of public schools available to students often varies more across cities than across demographic groups within a given city.

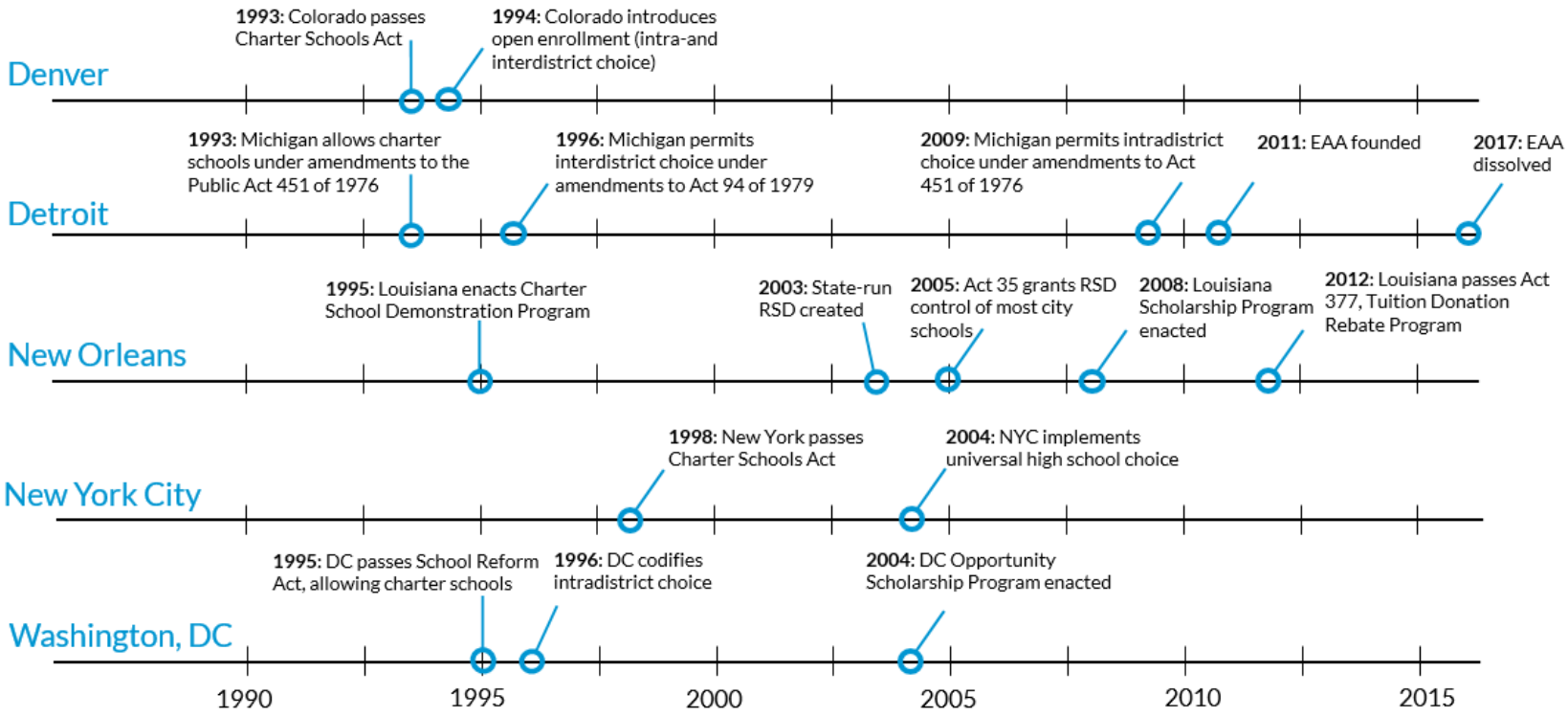
Increased School Options and School Choice

Since the 1990s or earlier, policymakers have acted to expand school choice in our study cities. Inter- and intradistrict choice, charter schools, and scholarships for private schools provide new school options to families (figure 1). Many of these policies, such as interdistrict choice or school voucher policies, are implemented at the state level. In some cases, school choice policies are implemented at the state level but mediated through local districts. For example, interdistrict choice programs typically rely on the capacity of neighboring receiving districts.

FIGURE 1

School Choice Policy Timelines

1990–2018



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Source: Analysis of school choice legislation.

Notes: In Washington, DC, interdistrict choice options predate the 1990 start date of this timeline. In addition, intradistrict choice has been an option in at least some New York City Community School Districts, such as East Harlem's District 4, since the 1970s. EAA = Emergency Achievement Authority; RSD = Recovery School District.

Most of our cities have adopted interdistrict choice, where city students may attend schools in nearby school districts, as policy since the mid-1990s or earlier. Interdistrict choice typically makes participation voluntary for receiving districts. In Washington, DC, interdistrict choice to schools in Maryland and Virginia is an option, but only if the sending student's family pays tuition to the receiving school district.

Intradistrict choice, sometimes called open enrollment, allows students to attend district schools outside their zoned neighborhood school. This kind of choice among public schools is available to at least some degree in all our study cities, with implementation years ranging from as early as 1994 (in Denver) to as late as 2009 (in Detroit).

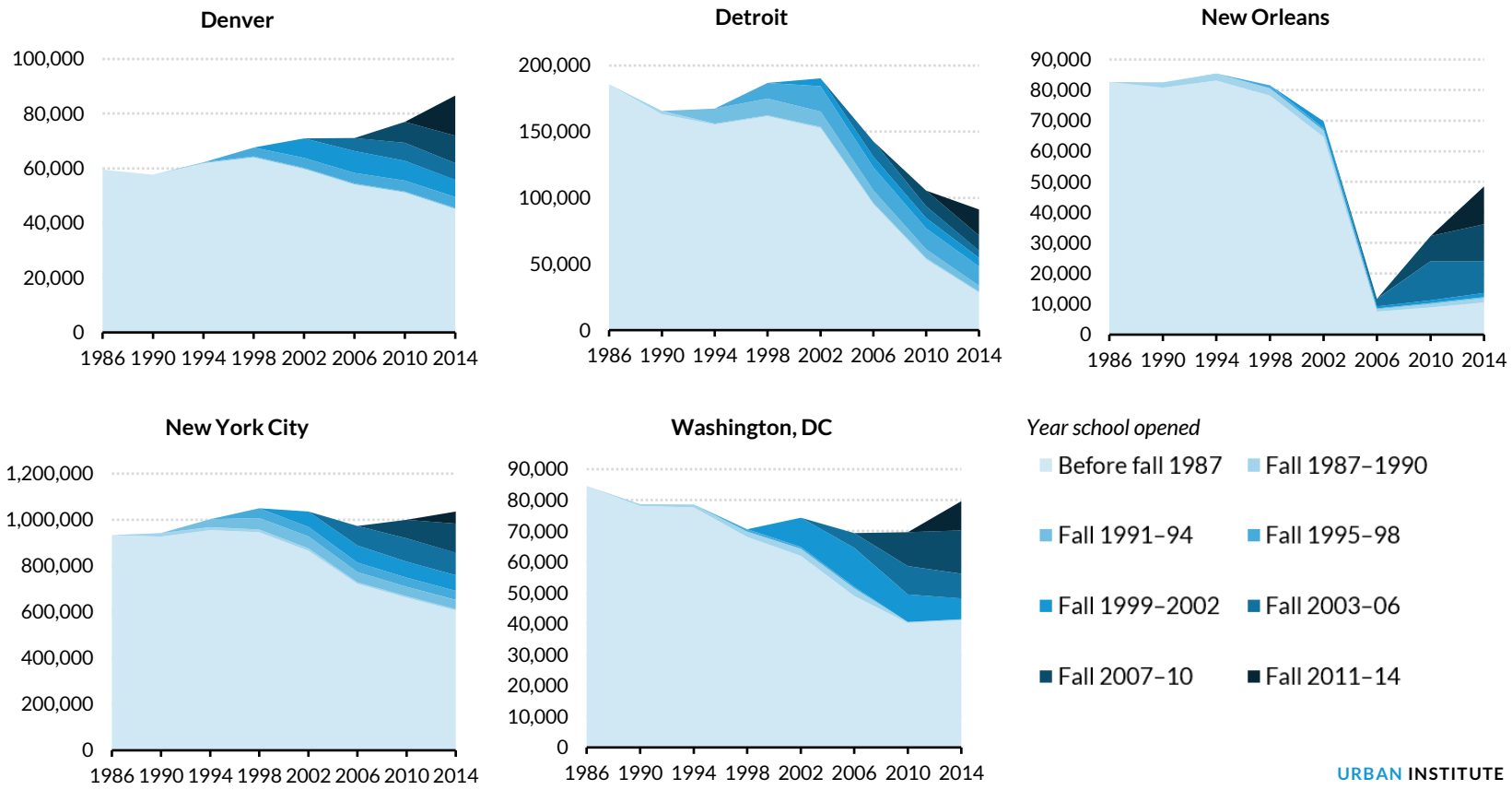
All the cities in our study also have charter schools within their district boundaries. Our cities were affected by state-level charter authorization laws that were first enacted in the 1990s, between 1993 (Denver and Detroit) and 1998 (New York City). School districts have different levels of control over the operation of charter schools within their boundaries. For example, in Denver, charter schools have a contract with Denver Public Schools, and the Denver Public School Board decides on the opening and closing of schools. In Detroit, the district may authorize charter schools, but schools may also be authorized by public higher education institutions and intermediate (county-level) school districts.[3]

Over nearly three decades, shifts and changes in school district policies have led to an increase in the overall number of new schools in each district. However, the patterns of enrollment in these choices over time have varied by city. For example, when we look at the opening of new schools, we find public school enrollment trends that are influenced both by policy changes and by larger economic and demographic changes (figure 2). Although enrollment levels do not always capture the level of growth of a sector (for example, a city could see a sudden increase in the number of new schools, but these schools steadily increase to their full enrollment share over the years as they add grades), examining these levels offers a baseline understanding of the shifts in school enrollment over time.

FIGURE 2

Enrollment in New Schools over Time

Fall 1986 to fall 2014



Source: Analysis of NCES Common Core of Data from fall 1986, 1990, 1994, 1998, 2002, 2006, 2010, and 2014.

Notes: Analysis is of student membership in city public schools that were operational during the school year. We identify new schools as those that have a new National Center for Education Statistics identification number.

The largest enrollment change occurs in New Orleans, where enrollment dropped sharply after Hurricane Katrina, as measured in the fall of 2006. Since the storm, the city has slowly recovered more than half of its previous public school enrollment. Most of the recovery has been in the form of enrollment in new public (typically charter) schools, many of which were founded after the storm. In Detroit, the decline in student population echoes declines in the city's overall population in the early 2000s. However, even as enrollment has fallen, Detroit has opened a substantial number of new schools; more than half of Detroit public school students are enrolled in schools that were opened after the fall of 1987.

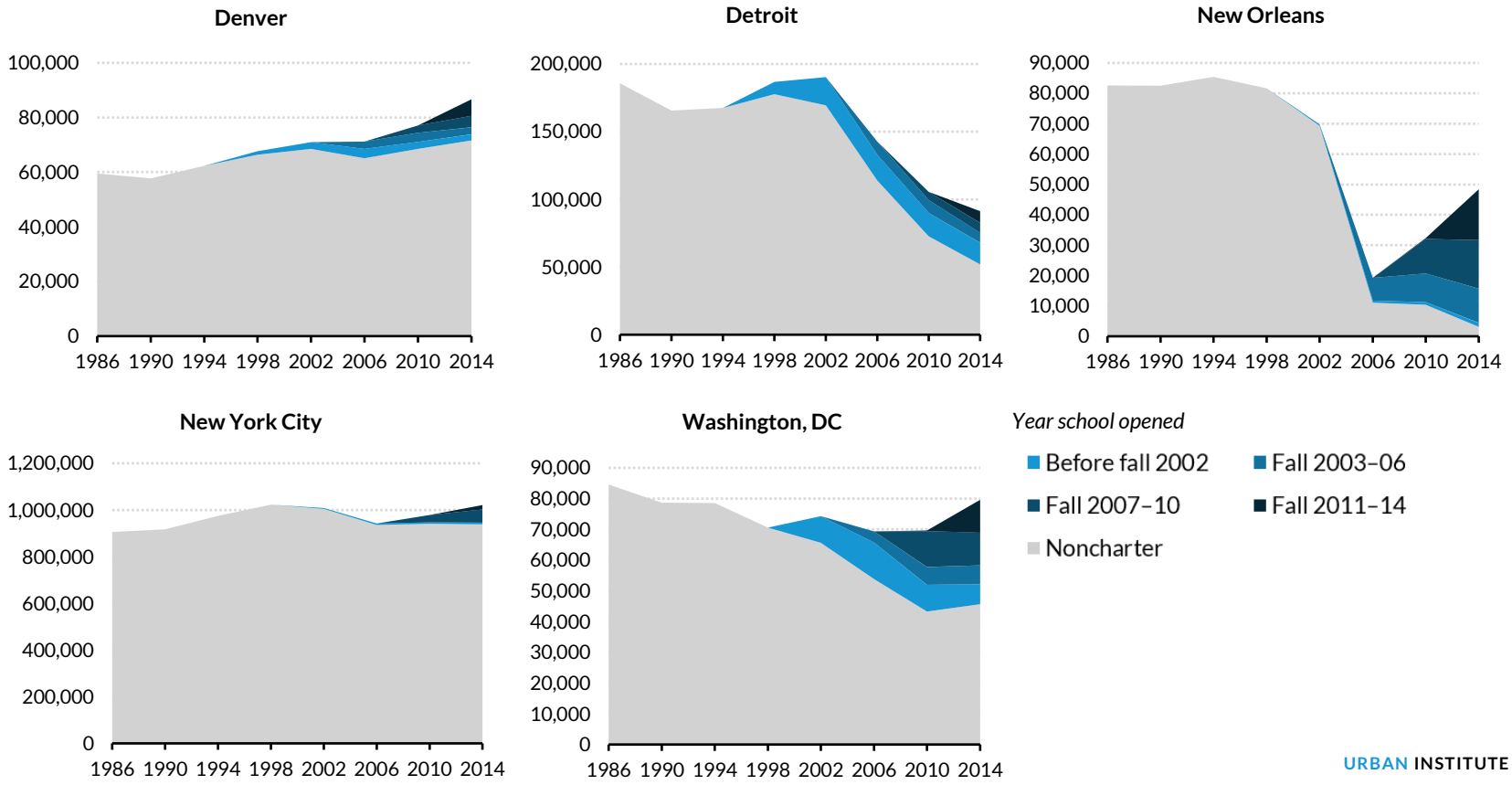
Shifts in enrollment in new public schools are less dramatic in Denver, New York City, and Washington, DC, but patterns still emerge. For example, among schools founded since 1987, schools that were opened from fall 1999 forward tend to enroll a larger share of students than schools founded before this period. Part of the reason for this trend is the increase in the number of new schools during this time. For example, roughly 230 new schools opened in New York City in the 12 years between fall 1987 and fall 1998, but about 710 new schools opened in the 12 years between fall of 1999 and fall 2010. Many of these schools may be small schools that are located within former large comprehensive high schools, particularly in New York City, where the movement was prevalent (Bloom and Unterman 2014; Schwartz, Stiefel, and Wiswall 2013). The evolution of these new school options, whether in new buildings or colocated on previous school sites, changes the set of school choices available to families.

All five cities have seen large enrollment increases in new schools, but enrollment growth in new charter schools varies more widely across cities. For example, New York City and Denver have experienced relatively slow charter growth, at least as a percentage of total enrollment, while the vast majority of New Orleans students are now enrolled in charters (figure 3). Detroit has seen substantial growth in enrollment in its charter sector, with a large share enrolled in schools that were founded before the fall of 2002. Washington, DC, has similarly experienced a large increase in charter school enrollment, with the largest share of new charter students enrolled in schools that were founded between fall of 2007 and fall of 2010.

FIGURE 3

Enrollment in Charter Schools over Time

Fall 1986 to fall 2014



Source: Analysis of NCES Common Core of Data from Fall 1986, 1990, 1994, 1998, 2002, 2006, 2010, and 2014,

Notes: Analysis is of student membership in city public schools that were operational during the school year. In some cases, schools that did not report as charters in previous years of data later reported as charters under the same NCES school ID. Those schools are counted in the first year that they identify as a charter school.

Differences in School and Student Location

How far students travel to school may depend, in part, on the number and location of choices available to them. For example, we might expect students who live near an abundance of schools to be less likely to travel far than a student who has fewer choices nearby. Further, we may expect these patterns to vary by city and by family characteristics.

We use publicly available data from the American Community Survey to measure the location of students relative to public schools by school-age group: elementary (ages 5 through 9), middle (10 through 14), and high school (15 through 17). Although proximity to schools varies by poverty status as well as race and ethnicity within our cities, we find that proximity to schools generally varies more across our five cities than between student demographics within them (appendix tables A.1a–c).

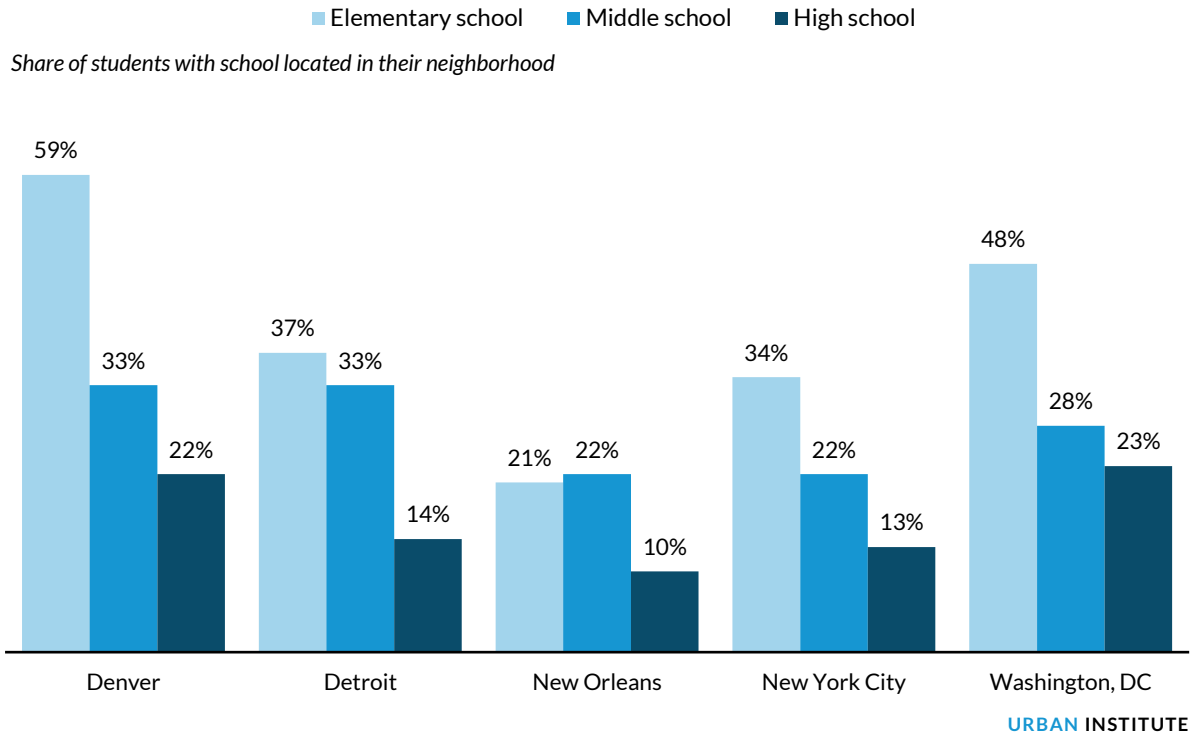
When we look at the share of school-age students who have at least one public school (traditional or charter) in their home neighborhood (defined as the census tract), we find substantial differences across cities (figure 4). For example, though nearly 60 percent of elementary-age children in Denver have at least one public elementary school in their neighborhood, 21 percent of elementary-age students in New Orleans have a school in their neighborhood. Some of this variation may be because of differences in the average number of students in each census tract across cities. For example, New Orleans and Detroit experienced population declines in the past several decades, a trend that may affect the distribution of students relative to schools.

The likelihood of having a nearby public school generally declines as students grow older, though the steepness of this decline also varies by city. For example, students in Denver and Washington, DC, generally see a much steeper decline in the availability of middle schools relative to elementary schools in their neighborhood (in large part because they are much more likely to have an elementary school in their neighborhood). In Detroit and New Orleans, the steeper drop-off in neighborhood school availability is between the middle school and high school years. In New York City, there is a steadier drop-off in the availability of elementary, middle, and high schools.

These differences across cities could reflect historic school siting policies (e.g., an effort to have small elementary schools that serve individual neighborhoods or an effort to locate high schools in the urban center or near transportation hubs), but these differences could also reflect the preferences of families. For example, families who prefer that their children walk or bike to school may opt to move to a neighborhood with a local elementary and middle school. Families may also choose to live closer to schools if the nearby available housing stock is more amenable for families (e.g., multiple bedrooms).

FIGURE 4

School-Age Children with at Least One Public School in Their Neighborhood



Sources: Analysis of NCES Common Core of Data from Fall 2014 and ACS tract-level data from 2011–15.
Notes: Analysis is of traditional and charter public schools that were operational during the school year. Schools that offer kindergarten are classified as elementary, sixth grade as middle, and ninth grade as high school. Schools that offer multiple grades are included in both of the relevant analyses (e.g., kindergarten and sixth grade are included in both elementary and middle school). A neighborhood is defined as a census tract.

The cities in our report differ not only in the availability of at least one neighborhood option, but also in the total number of nearby school options. The average New York City elementary-age child has 13.9 schools within a one-mile radius, and the average New Orleans child has just 2.1 schools within the same distance. We would expect to see some differences across our cities based on differences in population density and urban form. However, across all cities, children from families in poverty have, on average, an equal or greater number of nearby schools compared with children who do not come from families in poverty (table 1).

There are several possible explanations for the fact that low-income families tend to live near a greater number of schools than other families. In cities with stronger private school traditions (such as New Orleans, New York City, or Washington, DC), new public schools may be less likely to be sited near students who have the means to attend a private option. Students from low-income households may be more likely to live in areas with a high population density, which might require a higher number of

schools to serve students in the areas. Further, school reforms aimed at improving the achievement of low-income students may have the effect of adding additional choices for these students. For example, charter schools may locate in areas near low-income students, and new public options may be added through other reforms, such as the division of previously large traditional schools, or the founding of new traditional public schools.

TABLE 1

Average Number of Schools within a One-Mile Radius for School-Age Children

Household poverty status	Elementary school	Middle school	High school
Denver			
Poverty	3.8	2.1	1.9
Nonpoverty	3.2	1.8	1.4
Detroit			
Poverty	3.4	3.2	1.9
Nonpoverty	3.4	3.0	1.7
New Orleans			
Poverty	2.1	1.9	1.0
Nonpoverty	1.9	1.9	1.0
New York City			
Poverty	16.6	13.1	11.2
Nonpoverty	12.6	9.2	8.1
Washington, DC			
Poverty	8.5	4.2	3.2
Nonpoverty	7.8	4.3	3.0

Sources: Analysis of NCES Common Core of Data from Fall 2014 and ACS tract-level data from 2011–15.
Notes: Analysis is of traditional and charter public schools that were operational during the school year. Schools that offer kindergarten are classified as elementary, sixth grade as middle, and ninth grade as high school. Poverty is measured as being below the poverty threshold for the given family size.

When assessing the number of school choices within one mile by race and ethnicity, the patterns within cities are less clear (appendix tables A.1a–c). For example, Hispanic and black students in Denver, New York City, and Washington, DC, consistently have more nearby options than white students for elementary, middle, and high school. However, in Detroit and New Orleans, variations among the most common racial and ethnic groups are less pronounced, and, in some cases, white students appear to live closer to more schools than students of color.

Measuring Student Travel Times to School

Though data on straight-line distance to schools are valuable, it is perhaps even more important to understand how long these journeys would take by different transportation modes, both to students' actual schools and to other schools their families might choose. Using individual-level data on where students live and the schools they attend, we calculate estimates of travel time to school, both by car and public transportation, in our five cities. We estimate travel times for kindergarteners in New Orleans, New York City, and Washington, DC; for sixth-graders in Denver, Detroit, and Washington DC; and for ninth-graders in all five cities.

We calculate the travel time for each student to her own school, as well as to all other schools that serve her grade. We report our results in terms of travel time by car or transit (e.g., bus, subway, ferry), rather than in distance traveled, both because time matters more than distance for families and to ensure consistency across cities (e.g., traveling a mile takes longer in some places than others).

We use estimated driving times and travel times by public transit from the Google Distance Matrix application programming interface (API). To simplify calculations, student addresses were matched to census blocks, and distance calculations were made from the population-weighted centroid of each census block.[4] Travel times were computed assuming the usual traffic for a departure time that is 30 minutes before the estimated start time for schools in the city. In cases where a school is less than one half-mile as the crow flies from the student's residence, the walking time was also calculated, and the estimated walking time replaced the estimated transit time if it was shorter.

Individual-level data for the study is from the 2013–14 or 2014–15 school years, but the Google API does not permit the calculation of travel times in the past. This study uses the estimate of driving and transit time as calculated for Wednesday, September 13, 2017. Although our cities have made small changes to their transportation system in the intervening three years (for example, Denver opened two new commuter rail lines, and Washington, DC, implements quarterly adjustments to its Metrobus routes), we believe that these changes are not substantial enough to bias our estimates. Moreover, there have not been significant enough changes in the residential patterns of students in these cities over the last four years to suggest gaps would look different with contemporaneous data.

Student Transportation in Five Cities

Transportation Policies Vary across City

Each of our cities has evolved its own set of transportation policies to help students move to and from school. Table 2 summarizes the transportation options that are available to students in our study, who were enrolled in kindergarten, sixth grade, or ninth grade. (See Urban Institute Student Transportation Working Group 2017 for detailed descriptions of the differences in student transportation policies.)

In Washington, DC, all students enrolled in regular education are provided with a pass for use on public transit to get to school. High school students in New York City, as well as some high school students in Detroit and Denver, also are given public transit cards to attend school, depending on distance. In all of our cities except Washington, DC, students in kindergarten and sixth grade are typically given yellow bus service if they live at least a specified minimum distance from school.

Each city provides transportation options, but the availability of these options can vary by school. All of our cities offer yellow bus or public transit transportation to the student's neighborhood school, but transportation to nonneighborhood schools and charter schools varies. Washington, DC, and New Orleans provide yellow bus or public transit service to nearly all public schools, but Denver and Detroit are less likely to provide transportation to nonneighborhood or charter schools. Students in sixth grade or below in New York City typically receive yellow bus transportation to schools in their neighborhood school district or to charter schools within the same borough.

TABLE 2

School Transportation for Eligible Students

Student access	Mode	Eligible distance (miles)
Kindergarten		
New Orleans		
Students in RSD charter, OPSB direct-run, or RSD direct-run school	Yellow bus	1
New York		
Students in regular education	Yellow bus	0
Students not served by yellow bus route	Public transit	0.5[a]
Washington, DC		
Students in regular education	Public transit	0
Sixth grade		
Denver		
Students in regular education	Yellow bus	2.5
Detroit		
Students in regular education	Yellow bus	0.75
Washington, DC		
Students in regular education	Public transit	0
Ninth grade		
Denver		
Students in a Success Express neighborhood	Yellow bus	0
Students outside a Success Express neighborhood	Public transit	3.5
Detroit		
Students who attend an EAA school	Yellow bus	1.5
Students who attend a DPS school	Public transit	2[b]
New Orleans		
Students in RSD charter, OPSB direct-run, or RSD direct-run school	Yellow bus/public transit	1
New York		
Students in regular education	Public transit	1.5[a]
Washington, DC		
Students in regular education	Public transit	0

Source: Analysis of district transportation policies.

Notes: New York offers half-fare public transportation to some students who live closer to school. For Denver, yellow bus includes both standard routes and Success Express routes. In all cities, students enrolled in special education have access to yellow bus service as needed. The Education Achievement Authority is Michigan's state-run school district. DPS = Detroit Public Schools; EAA = Education Achievement Authority; OPSB = Orleans Parish School Board; RSD = Recovery School District.

[a] New York City Public Schools offers a half-fare benefit to kindergarteners living less than a 0.5 mile and ninth-grade students living more than 0.5 miles but less than 1.5 miles.

[b] Detroit Public Schools offers a fare benefit for high school students who live more than 2 miles from school and are eligible for free and reduced-price lunch.

TABLE 3

Likelihood of Public Student Transportation Assistance by School Attended

	Traditional neighborhood school	Traditional nonneighborhood school	Charter school	Private school	Other districts
Denver	All	Few	Some	None	None
Detroit	All	Few	Some	None	Some
New Orleans	NA[a]	All	Most	None	None
New York City	All	Some	Most	Some	None
Washington, DC	All	All	All	Most	None

Source: Analysis of district transportation policy.

Notes: Transportation for charter schools in Denver and Detroit is provided at discretion of the school, except for charter students in Denver's Success Express regions, who are eligible for transportation through that service. Transportation for other district schools neighboring Detroit is provided at the discretion of the district. This table excludes assistance for students with special needs.

[a] New Orleans no longer has assigned neighborhood schools.

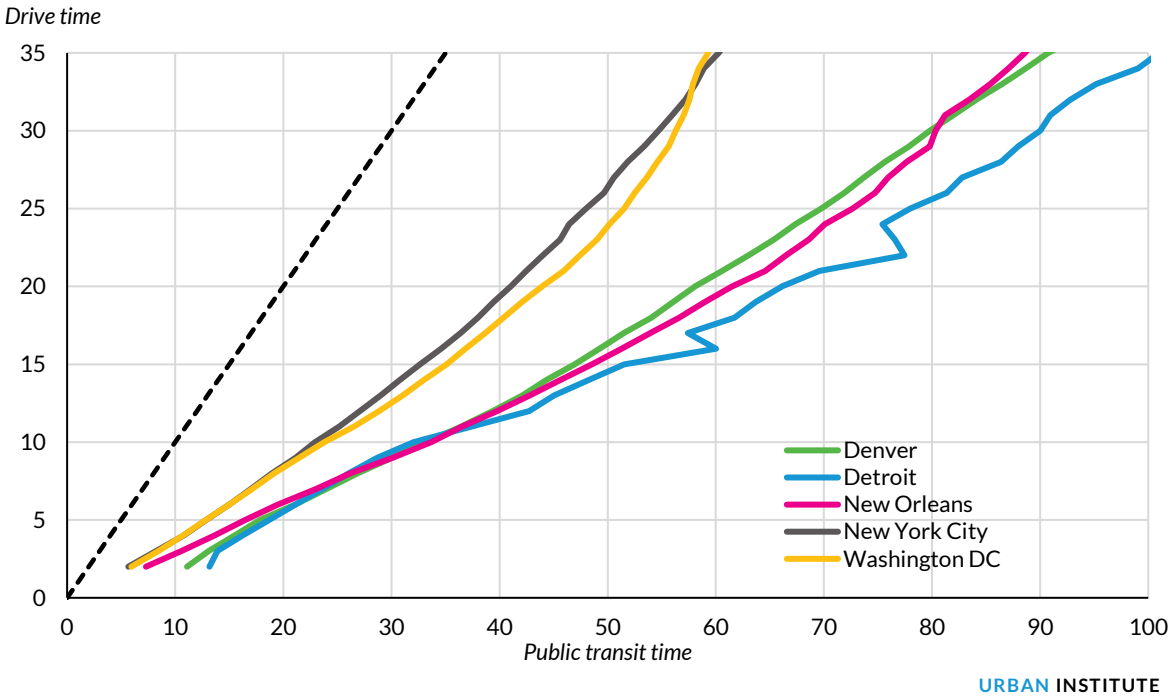
Relative Efficiency of Public Transit

Of our five study cities, New York City and Washington, DC, rely most heavily on public transportation to help students travel to school. Using our data on the driving and transportation time from each student block to each school they are eligible to attend, we can compare the relative efficiency of public transportation to driving in each city.

Figure 5 shows the average public transit time for all trips that take a given number of minutes driving. The black dotted line represents a scenario where public transit takes the same amount of time as driving (in traffic) would. As might be expected, traveling by public transportation takes longer than the same trip by car. However, both New York City and DC are closer to parity between driving and public transportation. On average, a 10-minute car ride to a school is equivalent to a roughly 23-minute public transportation trip in these cities. In Detroit, Denver, and New Orleans, a 10-minute drive is more likely to take 32 to 34 minutes by public transportation. As drive time increases, average transportation time grows at a slower rate in New York City and Washington, DC, while transit time generally increases more linearly in other cities.

FIGURE 5

Comparison of Driving Time (in Traffic) and Public Transportation Time from Students' Homes to Schools



Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, the Washington, DC, Public Charter School Board.
Notes: Figure reflects comparison of average transit time to school at each drive time interval, for every school a student would be able to attend. The black dotted line indicates a scenario where travel time by public transit time is equal to travel time by car, in traffic.

These results show that the policies enacted by our five cities are largely in line with the efficiency of the local transportation system. Cities that can more quickly deliver students to school tend to rely more on public transportation to transport students. In cities with less-efficient transportation, students are more likely to be offered yellow bus service. However, high school students in Denver and Detroit may still rely on public transportation for school, which means that a school that is a 15-minute car ride away could easily be a 50-minute journey by public transit.

Car Ownership in Low- and High-Poverty Neighborhoods

Access to a car is associated with an increased likelihood of employment among low-income households, as well as an increased likelihood of moving to neighborhoods with higher levels of school

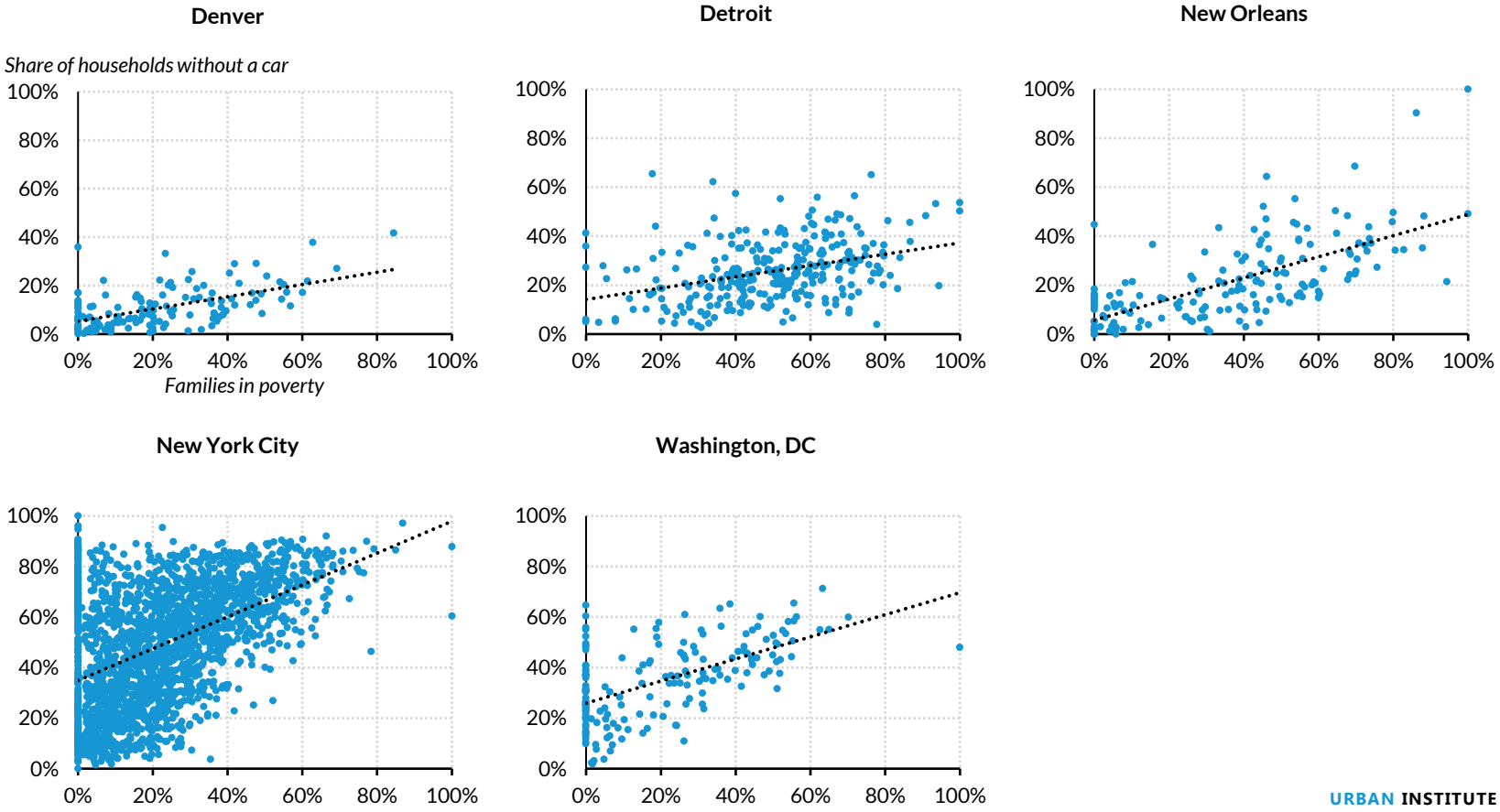
performance (Gurley and Bruce 2005; Ong 2002; Pendall et al. 2014). When we look at car ownership in our five cities by census tract, we find that the likelihood of owning a car decreases as the share of families in poverty increases (figure 6). However, the overall levels of car ownership tend to differ across our five cities.

Car ownership is more prevalent in cities with less-efficient transportation systems. Even in census tracts with the highest share of families in poverty, a household is more likely to have access to a car than not in these cities. In the highest-poverty quartile of census tracts in Denver, for example, just 15 percent of households do not own a car (relative to 4 percent in the lowest-poverty quartile). In New Orleans, 30 percent of households in the highest-poverty quartile of tracts do not own a car (relative to 6 percent). In the highest-poverty census tracts in Detroit, 28 percent of households do not have a car (relative to 17 percent).

Cities with more robust transportation systems have comparatively lower car ownership levels. Fifty-one percent of households in the highest-poverty tracts do not have a car in Washington, DC, (relative to 21 percent for low-poverty tracts), and 71 percent of high-poverty tracts in New York City do not have a car (relative to 37 percent in low-poverty tracts).

FIGURE 6

Poverty Rate for Families with School-Age Children and Share of Households without a Car by Census Tract



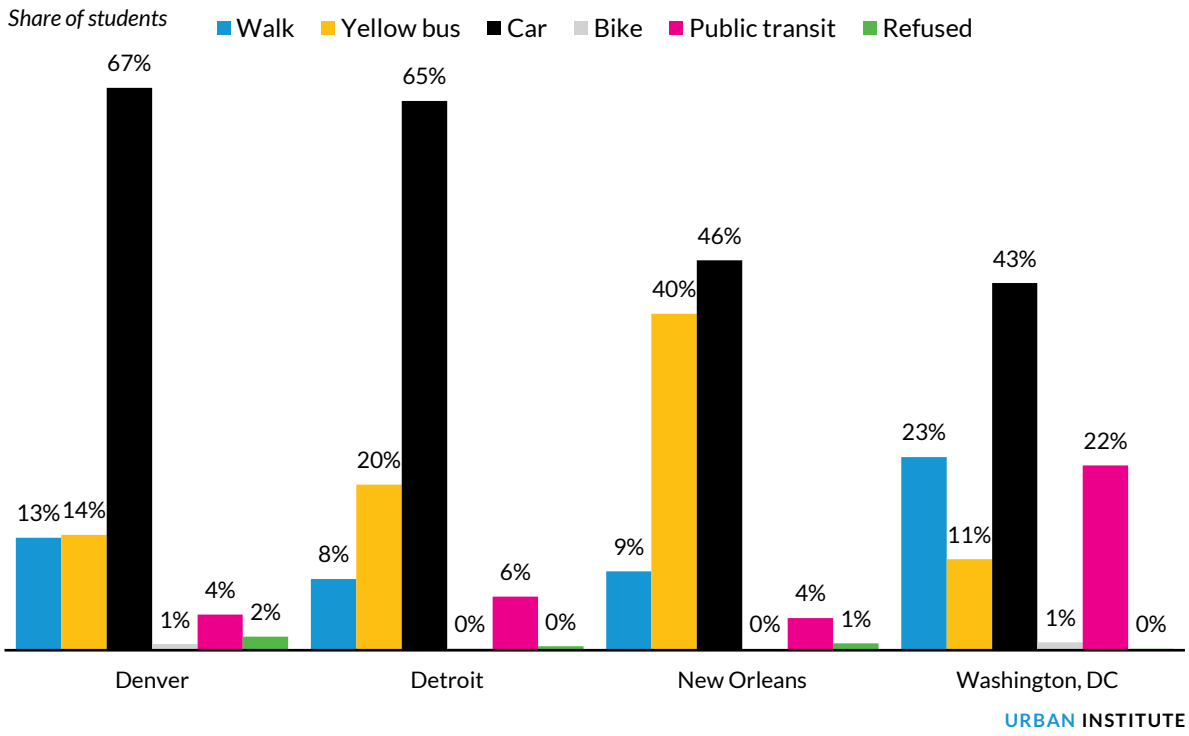
Source: Analysis of ACS tract-level data from 2011–15.
Note: Stippled line indicates line of best fit for data.

Surveys of public school families in four of our five cities show that car travel is the most frequent mode of transportation (figure 7). Car transportation is highest in Denver (67 percent reporting that they usually drive their students to school) and Detroit (65 percent), where publicly provided transportation to a given school tends to be less certain. Car transportation is lower in New Orleans (46 percent), with yellow bus transportation functioning as the second-most common option (40 percent). In Washington, DC, 43 percent of students drive or are driven to school, and 23 percent take public transit. Although parent survey data is unavailable for New York City, about 27 percent of adults in the city commute to work by car (compared with 39 percent in Washington, DC) and 57 percent commute via public transportation (compared with 38 percent in Washington, DC) (Urban Institute Student Transportation Working Group 2017).

FIGURE 7

Typical Mode of Transportation to School

For students in four of our five study cities



Source: Center on Reinventing Public Education.
Note: Survey responses include parents of children enrolled in any public traditional or charter school in the city.

Despite city-level differences in school transportation mode, we can compare the share of parents who report that transporting students to school is difficult across the four surveyed cities (appendix

figure A.2). Transportation to school is a concern for roughly a quarter of parents across our cities; at the low end, 23 percent of public school parents report transportation concerns in Washington, DC, and, at the high end, 30 percent of parents report concerns in New Orleans.

Assessing Travel Times to School

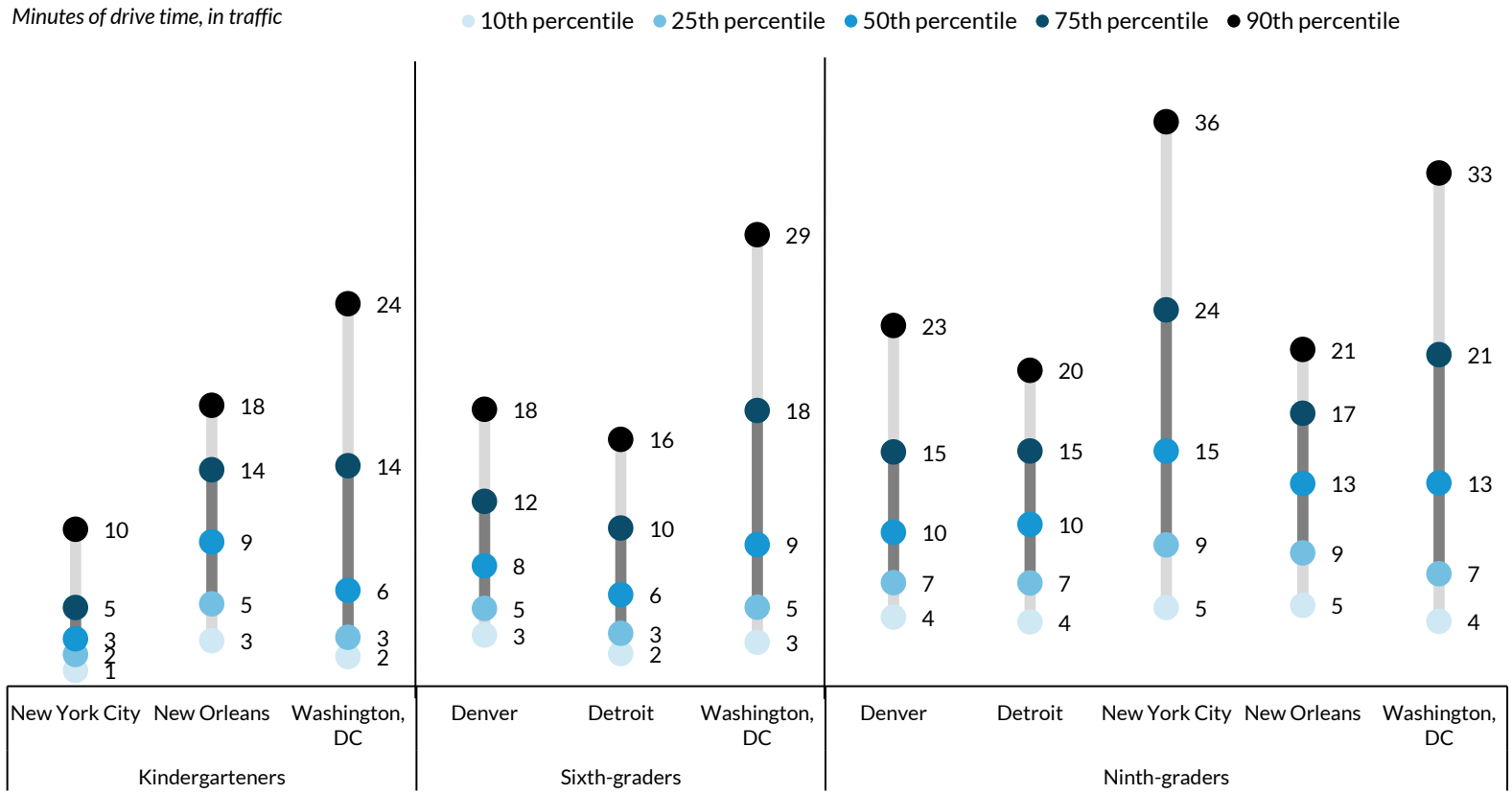
Grade Level

Travel times to school vary more by grade within a city than they do across cities. Even when students have access to school choices, younger students tend not to travel as far as older students (figure 8). Among the three cities for which we measured travel by kindergartners, the estimated median travel time ranges from 3 to 9 minutes from home (driving with usual traffic). Among sixth-graders, the median travel ranges from 6 to 9 minutes, and among ninth-graders, the range increases to 10 to 15 minutes from home.

These typical travel times mask some variation across students, but the variation is not substantial. For example, 75 percent of New York kindergarteners attend a school that is no more than 5 minutes away from their home by car (90 percent are less than 20 minutes away). In New Orleans and Washington, DC, 75 percent of kindergarten students attend school within 15 minutes of home (90 percent are within 18 to 21 minutes). These numbers are only modestly higher for older students in these cities, with 75 percent of ninth-graders attending school no more than 24 minutes from home across all five cities (and 90 percent no more than 40 minutes from home).

FIGURE 8

Distribution of Estimated Travel Time to School



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Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, the Washington, DC, Public Charter School Board.

These data also indicate that cities that make it easier for students to attend schools farther away do not have a substantially larger share of students traveling great distances. Though New Orleans mandates yellow bus service for nearly all students who live more than a mile from their school and DC only provides transit passes, kindergarteners do not travel much farther to school in New Orleans than in DC. The same is true for ninth-graders in these cities. Of course, there are differences between cities that may account for differences in travel patterns, but these results suggest that there are other factors limiting the degree to which students attend school far from home.

Few students live more than 25 minutes by car from their school, but commuting time increases at least twofold if they travel by public transportation (appendix figure A.2). For kindergarteners, the median time by walking or public transportation ranges from 7 minutes (New York City) to 28 minutes (New Orleans). For sixth-graders, the median time is 20 minutes for students in Detroit and Washington, DC, and 26 minutes in Denver. For high schoolers, the median public transit travel time ranges from 27 minutes (Washington, DC) to 45 minutes (New Orleans).

The larger differences in travel times by public transit across cities likely reflect the differences in the efficiency of the transit systems (relative to driving) documented above. We might not expect all groups of students to have the same travel patterns from home to school. The ability to travel to a school may depend on the resources families can devote to transportation, the enrollment capacity of nearby and distant schools, and many other factors. Given these differences, we also examine travel times by race and ethnicity, income, and school type, to see which students are traveling farthest to school, on average.

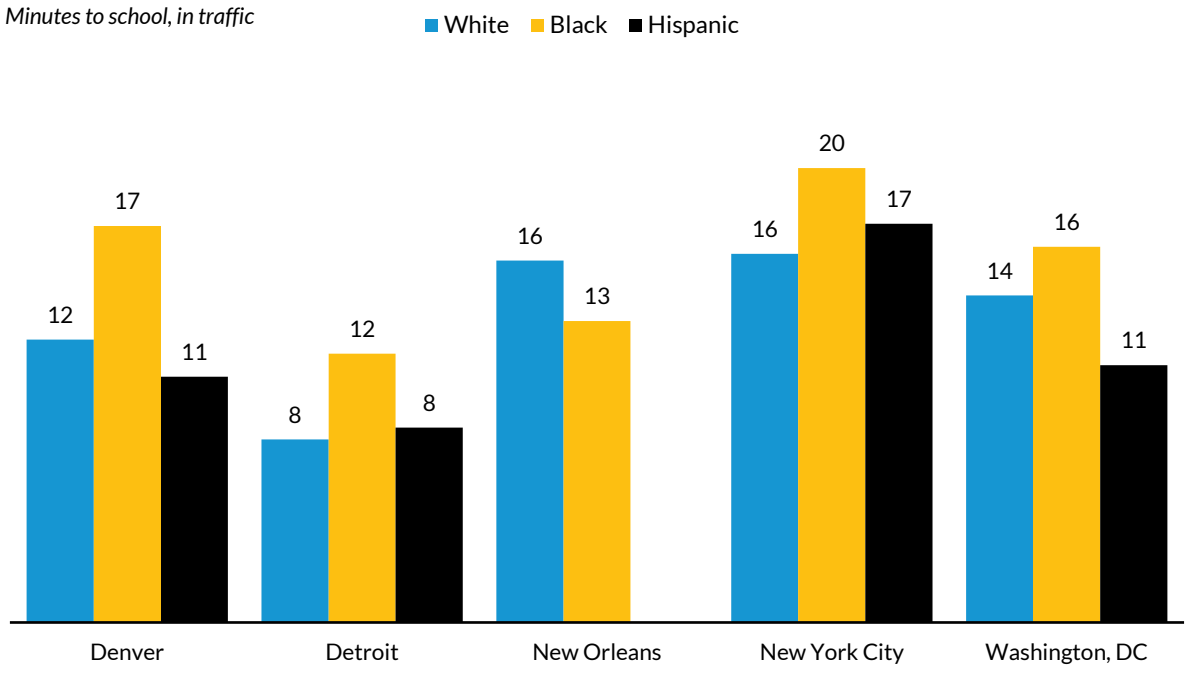
Race and Ethnicity

In four of our five cities, black high school students attend schools that are 2 to 5 minutes farther away by car, on average, compared with their white peers (figure 9). Hispanic high school students do not travel as far as black students, and, in Denver and Washington, DC, Hispanic students also have shorter driving-time commutes than their white counterparts.

The pattern we observe for high school students holds for students in the lower grades as well. In nearly every grade we observe, black students travel an average of 1 to 5 minutes farther than white students. This difference is not the influence of a few outlier students. Black students at the 25th, median, and 75th percentiles all travel farther relative to their white counterparts at the same percentiles.

FIGURE 9

Average Driving Time to School for Ninth-Graders by Race and Ethnicity



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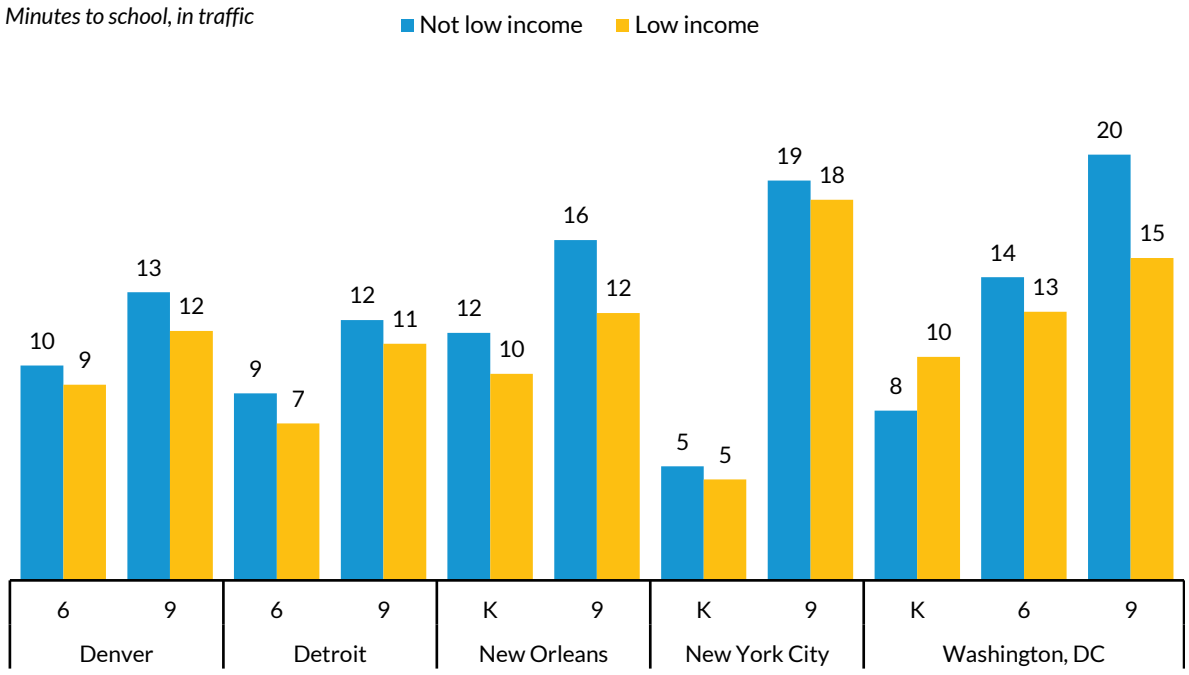
Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, the Washington, DC, Public Charter School Board.
Notes: New Orleans data come from an imputation of race and ethnicity based on student's home location. See appendix C for more details.

Income

When we look at travel time by family income (as measured by receipt of a free or reduced-price lunch), we find that students from low-income families typically do not travel farther than their comparatively advantaged peers. In fact, in nearly every city-grade pair, low-income students face relatively lower travel times (figure 10). Differences by family income between the two groups are generally not as large as the difference between black and white students, but they exist across all five of our cities.

FIGURE 10

Average Driving Time to School by Income Status



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Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, the Washington, DC, Public Charter School Board.
Notes: Low-income status is defined differently for different cities based on available data; consult the appendix C for further information. New Orleans data come from an imputation of low-income status based on student's home location.

Because black students in these five cities also tend to be students identified as low-income, these results may seem surprising. However, these results reflect the high proportion of students who are classified as low-income in our data (ranging from 75 percent in Denver to 92 percent in New Orleans). Among the minority of students who are not low income, we often observe a reversed pattern by race: black students who are not low income tend to attend distant schools, and white students who are not low income tend to attend schools that are closer. Data from Washington, DC, tabulated by both race and income illustrates this pattern (table 4).

TABLE 4

Average Travel Times for Black and White Sixth-Grade Students in Washington, DC

	Not low income	Low income	All
Black	20.8 mins *n = 251*	12.6 mins *n = 3,354*	13.2 mins
White	9.6 mins *n = 306*	12.5 mins *n = 350*	11.2 mins
All	14.5 mins	12.6 mins	

Sources: Analysis of student-level data from the District of Columbia Public Schools, the Washington, DC, Public Charter School Board.

School Type

It is possible that charter school students will travel farther to school than their counterparts in traditional public schools because charters typically admit students without regard to where they live. Additionally, parents may be willing to tolerate a longer commute in exchange for perceived higher academic quality or a diverse student body (Glazerman and Dotter 2017). Demand for charter schools, as measured by student waitlists, is also high in our study cities, particularly in New York City and Washington, DC, so capacity constraints at nearby charter schools could push students to more-distant charter options.

But this may not be true universally. Charter schools are often located in neighborhoods with a large share of students of color and in neighborhoods where traditional public options may be perceived as less desirable by parents (Burdick-Will, Keels, and Schuble 2013; Glomm, Harris, and Lo 2005; Jacobs 2013). Given parental preferences for schools that are nearby (Glazerman and Dotter 2017), we might expect charter schools to draw students from roughly similar distances as traditional public schools. Additionally, traditional public schools may also draw students from outside their attendance zones under intradistrict choice policies.

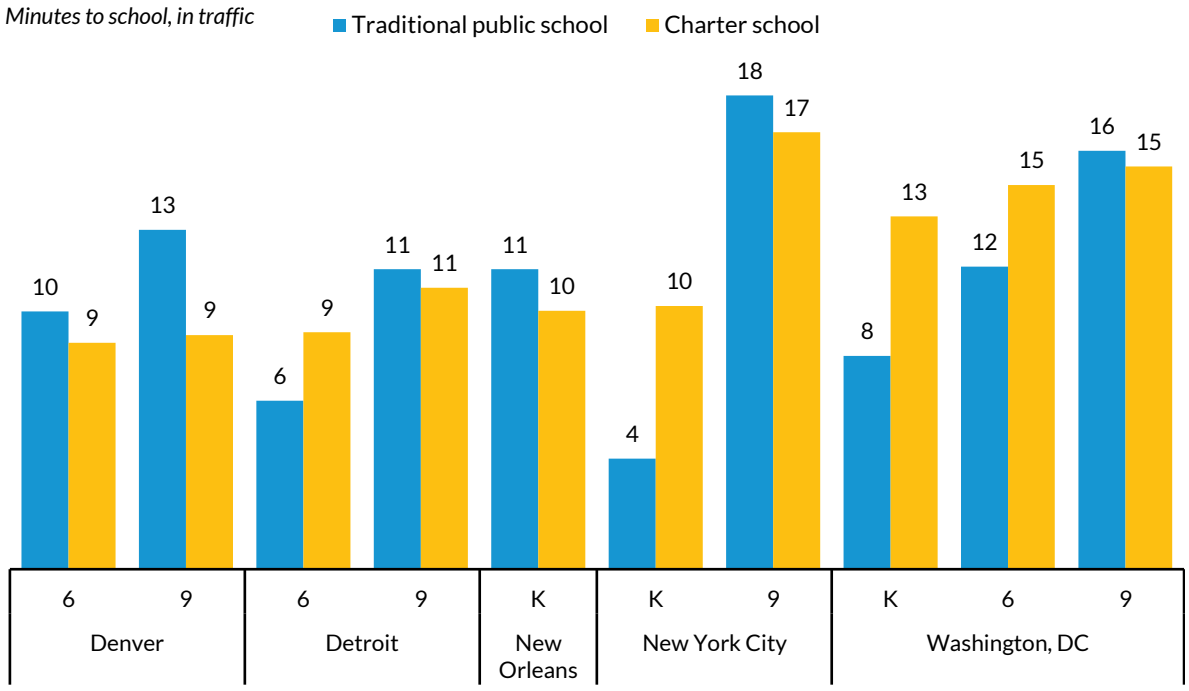
When we look at travel times by type of school attended, we see diverging patterns by grade level and city. The younger students attending charter schools (those in kindergarten) tend to travel significantly farther from home, compared with their peers in traditional public schools. Students who attend charter school in New York City travel nearly twice as far by car than students who attend traditional public school (10 versus 4 minutes), and the difference in Washington, DC, is also substantial (13 versus 8 minutes). The difference in New Orleans, where there are very few traditional public schools (and no neighborhood-zoned schools), is smaller.

A similar pattern holds for sixth-graders in two of the three cities for which data are available (Detroit and DC, with Denver as the exception). But among ninth-graders, the pattern is reversed: those attending traditional public schools tend to travel as far or farther than those in charter schools (figure 11). The difference is largest in Denver; in the other cities, average travel times are roughly similar between sectors.

In sum, younger students in Detroit, New York City, and Washington, DC, travel farther, on average, to charter schools than traditional public schools, and students in Denver tend to travel farther to traditional public schools. The differences across grade levels may stem, in part, from the great ability and willingness of older students to travel further to school (regardless of sector) and that high schools are often seen as citywide resources that offer specialized programs or vocational training.

FIGURE 11

Average Driving Time to School by School Type



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Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, the Washington, DC, Public Charter School Board.

Student Travel Patterns

In every city, black students travel farther to school than white or Hispanic students. However, the small proportion of students who are not low income tend to travel slightly farther than their more numerous low-income peers. These differences may be indicative of differences in both preferences and residential location relative to desired schools. We might expect that charter school students travel farther than those who attend traditional public schools, but this is not always the case. This may reflect school siting decisions by charter schools and may also reflect increased student enrollment in nonneighborhood district schools.

When we look at maps of student travel in our five cities (appendix B and interactive maps available at www.urban.org/research/publication/road-school), we find that transportation times tend to be unevenly distributed across student populations in neighborhoods across each city. In general, students who are nearer to the edges of our school districts tend to have longer average travel times to school. Students in areas that are separated by natural barriers (such as rivers or public parks) tend to travel farther. Students in the Algiers and New Orleans East neighborhoods in New Orleans are isolated from the main part of the city by the Mississippi River and navigation canals. Students in Wards 7 and 8 in Washington, DC, have to travel across the Anacostia River to get to schools in the central downtown area. In addition, political boundaries, such as district boundaries, can also play a role. For example, students in the Far Northeast neighborhood of Denver are isolated from the rest of the district because of the way district boundaries are drawn.

Some Students Are Farther from High-Quality Schools

Defining High-Quality High Schools

In all of our cities, the students who travel the farthest to school are those who travel to high schools. Average travel time ranges from 11 minutes of driving in traffic in Detroit to 18 minutes in New York City. This higher travel time may be a function of high schools having larger enrollments (and therefore fewer locations) as well as the fact that some high schools are designed for specific student interests (such as performance arts or vocational education).

Because of the longer distances that these students must travel, we examined how far ninth-grade students must travel to get to a "high quality" school in each of our five cities. The definition of "high quality" may vary by family and by individual student needs. We thus use several measures of high

school resources[5] and student outcomes. The first measure assesses how far a student would have to travel to get to a school that has a high (i.e., is in the top quartile) proportion of veteran teachers (teachers who have more than two years of experience). The second measure estimates how far an average student would have to travel to access a city school that offers calculus, an important course for postgraduate success in STEM fields (Tyson et al. 2007). The final measure assesses how far a student would have to travel to reach a school with a high (top quartile) graduation rate.

This analysis is only done for students who have already opted into the public school system (e.g., are not enrolled in private school). Further, these numbers do not account for capacity constraints at schools or other barriers, such as a high school application process or lottery-based enrollment that would keep a student from enrolling in their nearest "quality" school.

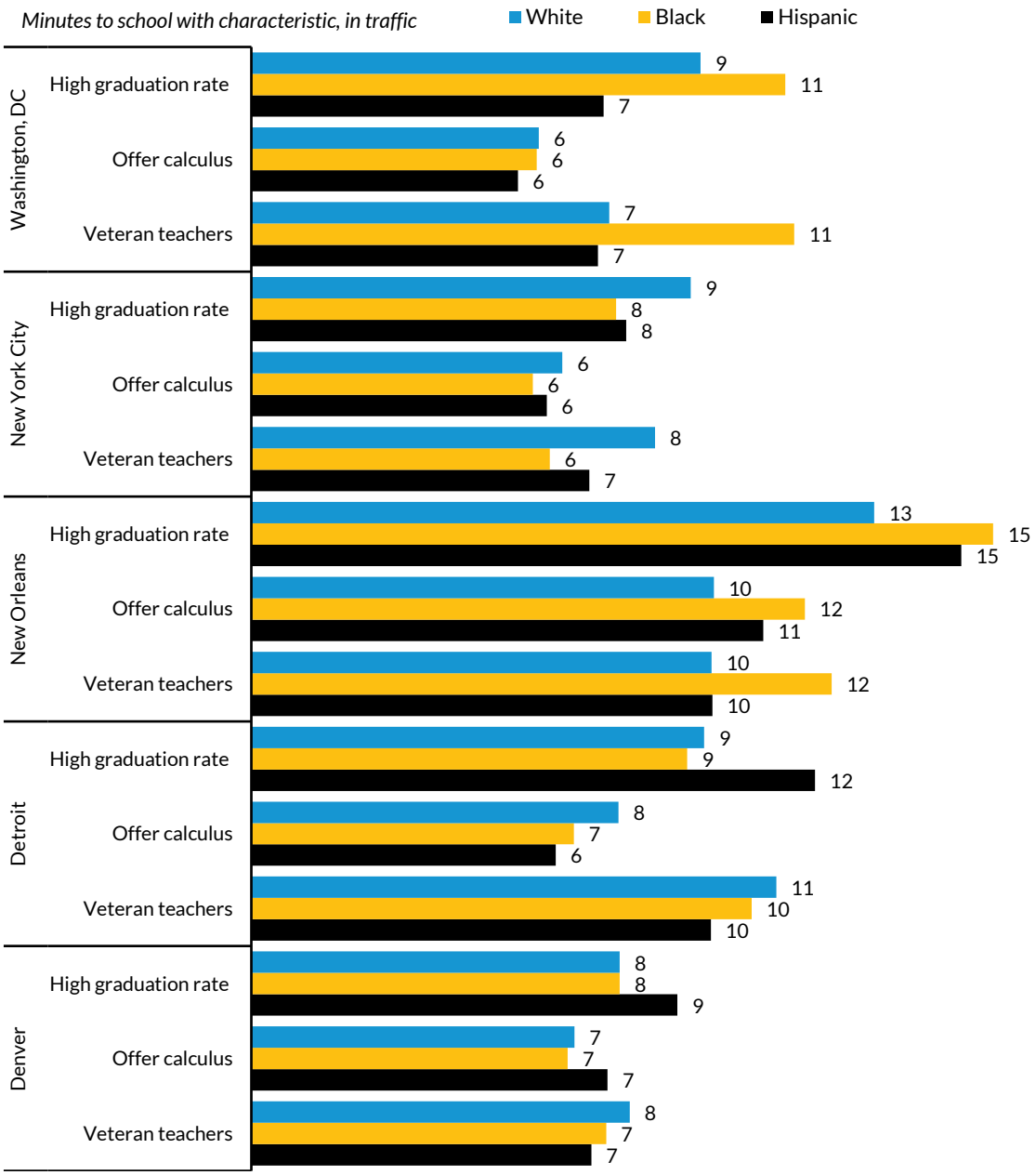
Distance to High-Quality High Schools

The data show that average distance to our variously defined high-quality high schools differs substantially across cities and across student demographics (figure 12). For example, in Washington, DC, black ninth-grade students would have to travel an average of 4 minutes farther by car than white or Hispanic student to access a school in the top quartile of veteran teachers. In other cities, such as Denver and Detroit, it is white students who live slightly farther, in terms of driving distance in traffic, from high-quality schools than students of color.

FIGURE 12

Distance to Quality High School

As defined by three metrics



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Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, the Washington, DC, Public Charter School Board and analysis of the 2013–14 data collection of the Office for Civil Rights.

Notes: "Veteran teachers" indicates average distance to a school that is in the lowest quartile among city schools in terms of percentage of new teachers (those with one or two years of experience). "Offer calculus" indicates average distance to a school that offers calculus coursework. "High graduation rate" indicates average distance to a school that is in the highest quartile among city schools in terms of high school graduation rate. New Orleans data are based on an imputation of race and ethnicity based on student's home location. See appendix C for more details.

Our estimates indicate that most ninth-grade students are, on average, about a 10-minute drive from their nearest high-quality school along these measures. Although black students tend to travel farther to school than white students in every city in our analysis, we do not see a similar universal pattern when looking at distance to a high-quality school.

When we count the average number of options available to ninth-grade students within a 10-minute drive, we see large variations by city and some variations by race (appendix table A.4). For example, students in New Orleans have an average of 4 high schools within 10 minutes' drive, students in Washington, DC, and Denver have an average of 6, and those in Detroit and New York City have an average of 12. Black and Hispanic high school students tend to have more nearby school choices, on average, than their white counterparts. For example, black and Hispanic students in Washington, DC, have an average of 8 high schools within 10 minutes' drive in traffic (compared with 5 for white students). In New York City, black students have an average of 14 choices and Hispanic students have an average of 13, relative to 6 for white students.

Geographic and Choice Contexts Matter

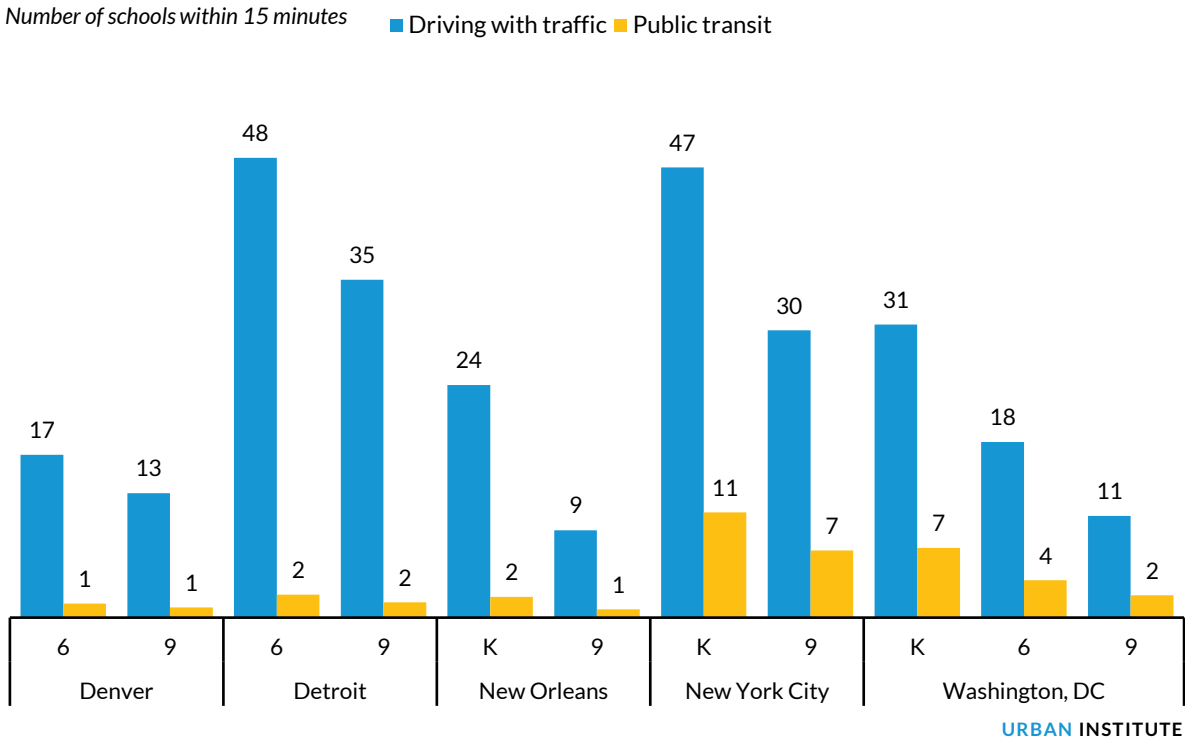
Choosing to Drive or Take Transit

How far students travel to school reflects both the options that are available to a family and the choices the families make. Most students in our study live less than 15 minutes from their school if they were to drive. We showed, however, that households in neighborhoods with a higher proportion of families in poverty were less likely to own cars.

When we look at access to schools within a 15-minute radius, we find that a 15-minute drive garners far more choice than a 15-minute transit ride. In nearly every grade, students have access to 10 or more schools when traveling by car for 15 minutes or less, but typically have access to fewer than 10 schools when traveling for the same amount of time on public transit (figure 13). For example, the average kindergartener in Washington, DC, lives within a 15-minute drive of 31 elementary schools but can only get to 7 schools in that time on public transit.

FIGURE 13

Number of Schools Available, by Mode of Travel



Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, the Washington, DC, Public Charter School Board

These differences in school choice by mode could have implications for equity. If students do not have access to yellow bus service or a family member who can drive them to school, their school choices could be much more restricted. Although students from low-income families tend to have more schools located near their homes, it is unlikely that proximity of schools could completely close the gap in choice for students who do not have reliable access to a car.

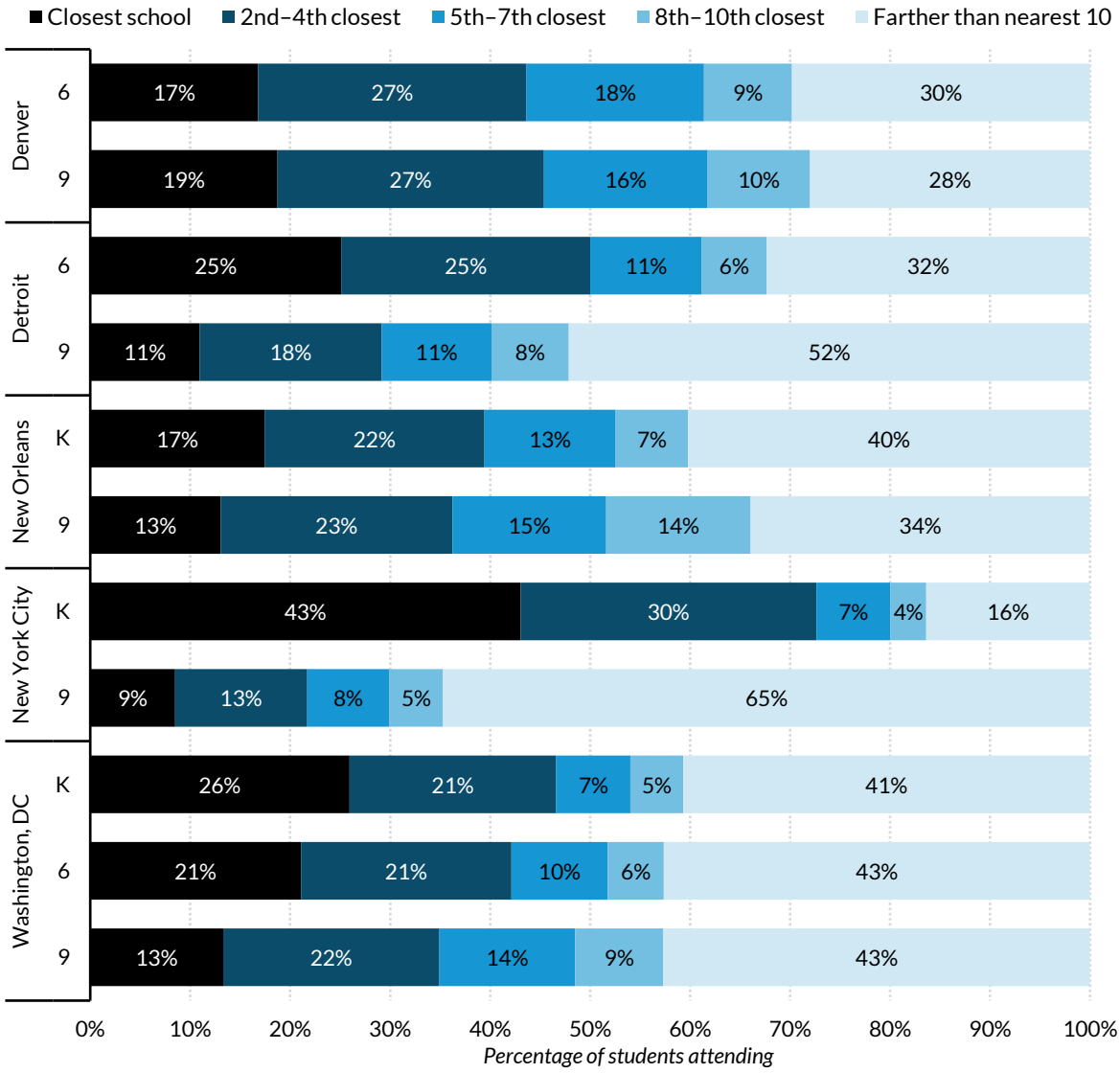
Students Often Bypass Their Nearest School

Another way to assess student travel to school is to look at whether students are attending their nearest school (as measured by driving time) or whether they are traveling to more-distant schools. In figure 14, we show the share of students who attend their nearest school, who "pass" by one other option, two other options, and so on.

FIGURE 14

Share of Students Attending Nearest School

As measured by driving time in traffic



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Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, and the Washington, DC, Public Charter School Board.

The results of this analysis show large differences in the likelihood of attending a nearby school by city and grade. Forty-three percent of kindergarteners in New York City attend their nearest elementary school, but just 17 percent of those in New Orleans and 26 percent of those in Washington, DC, do.

In high school, this pattern is reversed; just 35 percent of students in New York City attend one of their 10-nearest school options. A much larger share of high school students in our other cities (from 48 percent in Detroit to 72 percent in Denver) attend one of their 10-nearest schools. Very few high school students attend their nearest high school in any city. Denver has the highest proportion of students attending their nearest school (19 percent), and New York City has the lowest proportion (9 percent).

Though the number of school options within a 15-minute public transit ride is low across our cities, the majority of students in our cities, particularly high school students, attend a school that is not their closest school. In many cases, students travel farther than their 10-nearest school options.

Given that household car ownership is correlated with family poverty in our cities, we also looked at the number of options that are close to students from low-income backgrounds. Similar to our estimates from census data, we find that students from low-income families tend to have the same number, or slightly more, nearby options than students from nonpoor backgrounds. However, we do not see a distinct pattern in selection of nearby schools by income status across our cities (appendix tables A.2–A.4).

Limitations

Our analysis is subject to some limitations. First, we only examine one year of data for typical entry grades in elementary, middle, and high school. As a result, our analysis may miss changing patterns that could result from students switching schools over the course of a year or as they continue into other grades. For example, students may initially attend a school of choice and then return to their neighborhood school. Further, our data only capture students who are attending public schools in the city. Students who attend private schools, or schools outside the city's district boundaries, are excluded from the data, so our report does not reflect the travel patterns of or options available to these students.

Second, we do not directly observe the mode of transportation students select. We know roughly how long it would take them to travel to school by car or public transit, but we do not know the mode they use in practice. For cities that offer school buses, we do not know how long these trips take because of the intermediate stops made between the student's home and school.

Third, we must also consider that students are subject to some level of travel time uncertainty because of heavy traffic, weather, or other factors. If a route is unreliable, our travel time estimates

serve as a lower bound. Because students are expected to arrive at school on time (e.g., the first bell of homeroom), families may also shift toward earlier departures to decrease the probability of arriving late (Noland and Small 1995).

These limitations mean that our analysis is not a precise description of how long it takes students to get to school in each city, but a broad overview of where students attend school relative to where they live and how long it would take them to travel via different modes.

Conclusions

This study is the first to focus on the issue of transportation from home to school across multiple cities offering substantial school choice. Our analysis identifies similarities in student travel patterns across all five cities, even as their underlying school choice structures, transportation systems, and student population densities differ. This descriptive analysis opens several avenues for future research.

Although we find that student travel times are relatively reasonable on average (lower than 20 minutes driving time in traffic), some students travel long distances to attend public school in their city. It is critical to understand why students travel this far, and if they are selecting schools that provide academic advantages or services above what they could access closer to home. It is unclear how long commutes could potentially affect student outcomes in a given city with school choice. Travel to a high-quality option could yield substantial benefits for the student, but the student could also be at risk for increased lateness or absences because of her commute. If a student feels disconnected from her school community because of distance (e.g., unable to attend after-school activities), she could suffer academically and nonacademically.

An additional subject for further investigation is the set of transportation modes that students are using to get to and from school. Because of data limitations, we do not know whether the students in our sample actually use the transportation options available to them or whether they rely on other methods, such as walking, biking, or being driven by a parent. Understanding how students use different modes to get to school (and how often they rely on a secondary transportation mode, such as using a taxi or ride-share service with their parents if they miss their bus) would illuminate issues of safety and reliability in student transportation. In particular, the issue of transportation mode may be important for students who live relatively close to school, and who may therefore benefit from having a safe walking or bicycling route to school.

Finally, this report reveals some of the hidden trade-offs inherent in embracing school choice in a city. Just as there are inequalities and differences in students' academic performance across these cities, we see parallel inequalities and differences in the distances that students travel and in the availability of nearby school options. Experiments in targeted policy interventions, such as implementing transportation vouchers for low-income parents of very young students, using yellow buses on circulating routes (similar to Denver's Success Express), or changing the way that school siting decisions are made, might yield pragmatic solutions that further level the playing field for a city's most disadvantaged students.

Appendix A. Data Tables and Charts

TABLE A.1A

Estimates of Student Location Near Schools Using Public Data

As measured by estimates from Census and the American Community Survey (ACS), for five study cities

	Kindergarten						
	Overall	White	Black	Hisp	Asian	NonPov	Pov
Share of children with at least one school in their neighborhood (census tract)							
Denver	59%	58%	56%	60%	56%	61%	56%
Detroit	37%	51%	34%	53%	53%	36%	40%
New Orleans	21%	27%	19%	26%	41%	24%	18%
New York City	34%	31%	36%	36%	28%	33%	38%
Washington, DC	48%	44%	50%	49%	38%	51%	55%
Average crow-flies miles to nearest school							
Denver	0.4	0.5	0.4	0.4	0.5	0.4	0.4
Detroit	0.4	0.3	0.4	0.3	0.3	0.4	0.4
New Orleans	0.7	0.6	0.7	0.6	0.6	0.7	0.7
New York City	0.2	0.3	0.2	0.2	0.2	0.2	0.2
Washington, DC	0.3	0.4	0.3	0.2	0.3	0.3	0.2
Number of schools within one mile (crow flies)							
Denver	3.4	2.8	3.4	3.8	2.9	3.2	3.8
Detroit	3.4	4.2	3.1	4.6	6.6	3.4	3.4
New Orleans	2.1	2.5	2.0	2.2	1.3	1.9	2.1
New York City	13.9	10.6	16.2	16.1	10.4	12.6	16.6
Washington, DC	8.1	5.2	8.5	10.7	7.4	7.8	8.5

Sources: Urban Institute analysis of data from 2011–15 ACS, 2010 Census, and 2013–14 Department of Education Common Core of Data.

Note: Hisp = Hispanic; Pov = students in poverty; NonPov = students not in poverty.

TABLE A.1B

	Sixth Grade						
	Overall	White	Black	Hisp	Asian	NonPov	Pov
Share of children with at least one school in their neighborhood (census tract)							
Denver	33%	35%	35%	32%	36%	38%	26%
Detroit	33%	42%	31%	43%	61%	33%	35%
New Orleans	22%	25%	21%	25%	34%	25%	19%
New York City	22%	19%	25%	24%	17%	21%	25%
Washington, DC	28%	12%	30%	32%	21%	29%	33%
Average crow-flies miles to nearest school							
Denver	0.7	0.7	0.6	0.7	0.7	0.7	0.7
Detroit	0.5	0.4	0.5	0.4	0.3	0.5	0.4

	Sixth Grade						
	Overall	White	Black	Hisp	Asian	NonPov	Pov
New Orleans	0.6	0.7	0.6	0.6	0.6	0.6	0.6
New York City	0.3	0.4	0.3	0.3	0.4	0.4	0.3
Washington, DC	0.5	0.9	0.4	0.4	0.6	0.5	0.4
Number of schools within one mile (crow flies)							
Denver	1.9	1.5	2.1	2.0	1.9	1.8	2.1
Detroit	3.0	3.5	2.9	3.6	7.1	3.0	3.2
New Orleans	1.9	2.1	1.9	2.1	1.2	1.9	1.9
New York City	10.4	6.4	13.2	12.7	6.1	9.2	13.1
Washington, DC	4.4	1.9	4.7	6.5	3.7	4.3	4.2

Sources: Urban Institute analysis of data from 2011–15 ACS, 2010 Census, and 2013–14 Department of Education Common Core of Data.
Note: Hisp = Hispanic; Pov = students in poverty; NonPov = students not in poverty.

TABLE A.1C

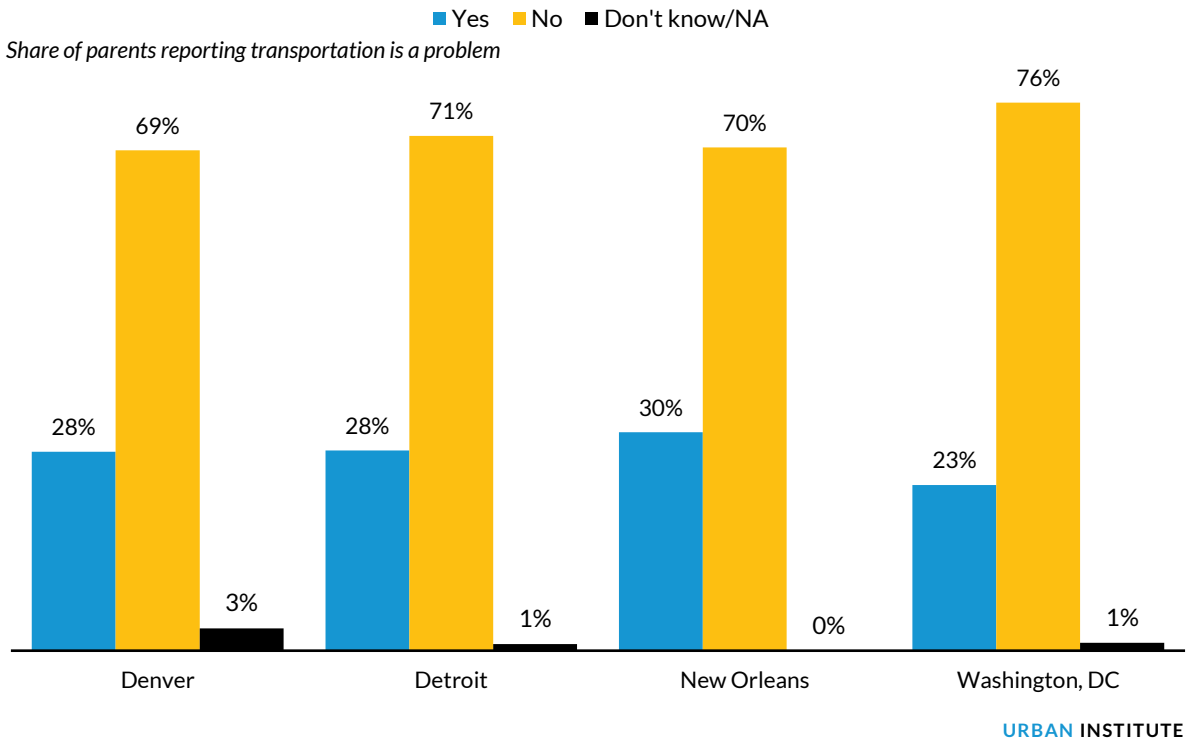
	Ninth Grade						
	Overall	White	Black	Hisp	Asian	NonPov	Pov
Share of children with at least one school in their neighborhood (census tract)							
Denver	22%	16%	26%	24%	22%	23%	23%
Detroit	14%	23%	13%	29%	4%	15%	15%
New Orleans	10%	12%	9%	10%	16%	11%	10%
New York City	13%	9%	16%	15%	10%	13%	14%
Washington, DC	23%	10%	25%	21%	16%	20%	24%
Average crow-flies miles to nearest school							
Denver	0.9	1.1	0.8	0.9	1.0	1.0	0.9
Detroit	0.8	0.6	0.8	0.5	0.5	0.7	0.7
New Orleans	1.0	1.1	0.9	1.0	0.8	1.0	0.9
New York City	0.5	0.6	0.4	0.4	0.5	0.5	0.4
Washington, DC	0.6	1.0	0.5	0.5	0.7	0.6	0.5
Number of schools within one mile (crow flies)							
Denver	1.6	1.0	1.8	1.8	1.4	1.4	1.9
Detroit	1.7	2.1	1.5	3.0	2.6	1.7	1.9
New Orleans	1.0	1.2	1.0	1.1	0.8	1.0	1.0
New York City	9.0	5.2	10.8	11.2	5.6	8.1	11.2
Washington, DC	3.2	1.2	3.3	5.0	3.0	3.0	3.2

Sources: Urban Institute analysis of data from 2011–15 ACS, 2010 Census, and 2013–14 Department of Education Common Core of Data.
Note: Hisp = Hispanic; Pov = students in poverty; NonPov = students not in poverty.

FIGURE A.1

Difficulty Getting to Transportation to School

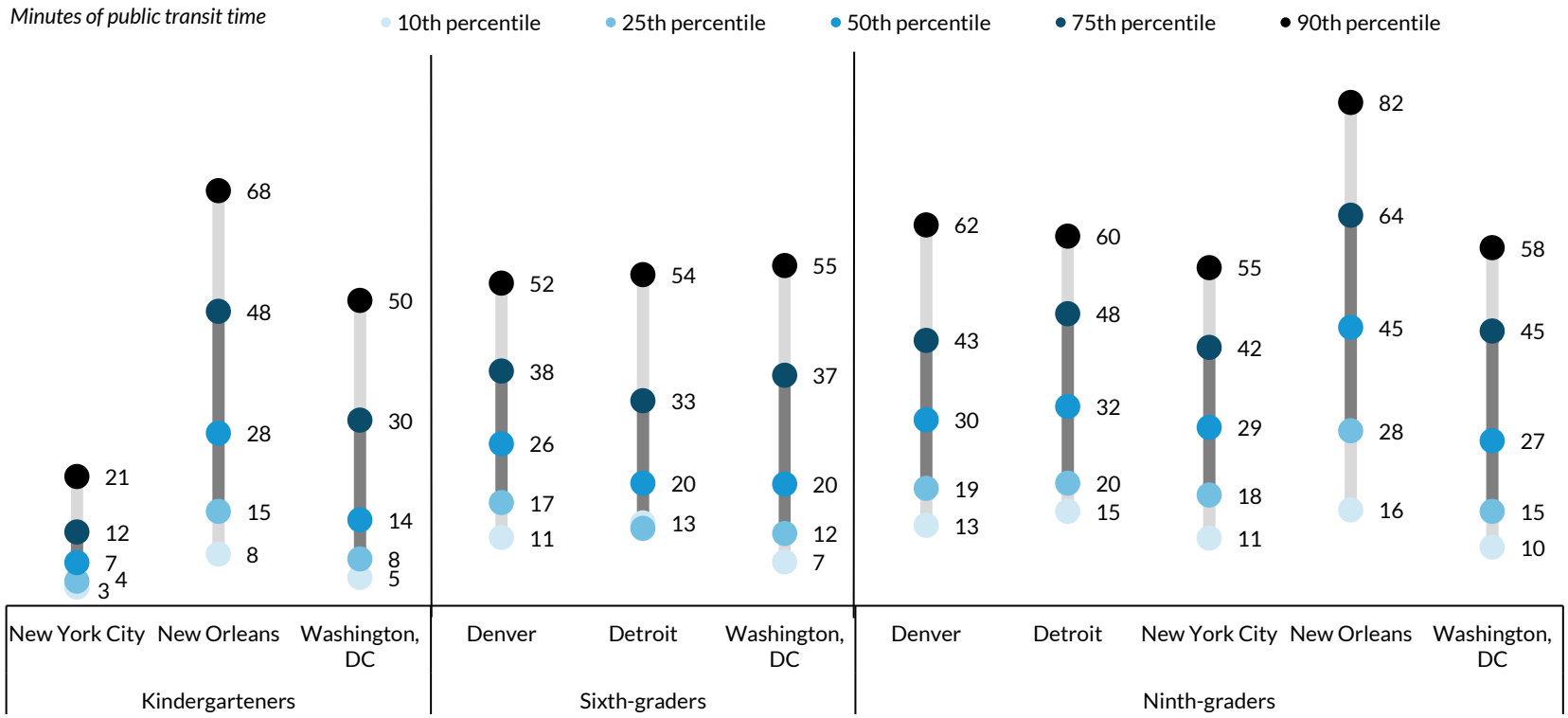
For parents in four of our five study cities



Source: Center on Reinventing Public Education.

FIGURE A.2

Distribution of Estimated Travel Time to School



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Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, and the Washington, DC, Public Charter School Board.

TABLE A.2

Descriptive Data for Kindergarteners

For three of our five study cities

	Overall	White	Black	Hisp	Asian	NonLow	LowInc	TPS	Charter
Sample size									
New Orleans	2,592	161	2409	†	†	139	1538	103	2489
New York City	70,708	11,811	17,446	28,501	11,276	19,359	51,349	62,653	8,055
Washington, DC	7,478	1,548	5,194	363	121	1,069	6,409	4,750	2,728
Average driving duration (minutes, in traffic)									
New Orleans	9.9	8.9	9.9	†	†	11.2	9.1	9.0	9.4
New York City	5.0	4.7	5.9	4.5	4.2	5.3	4.7	4.2	10.0
Washington, DC	10.1	6.7	11.1	11.2	7.1	7.9	10.4	8.1	13.4
Share of students attending nearest school									
New Orleans	17%	22%	17%	†	†	11%	16%	19%	17%
New York City	43%	52%	33%	42%	54%	46%	42%	48%	7%
Washington, DC	26%	43%	21%	6%	45%	54%	21%	36%	8%
Average number of schools within 10 minutes of driving in traffic									
New Orleans	9	10	9	†	†	8	10	10	9
New York City	11	13	25	22	15	16	22		
Washington, DC	11	17	19	24	14	13	20	18	20

Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, and the Washington, DC, Public Charter School Board.
Notes: Hisp=Hispanic; LowInc = students from low-income families; NonLow = students not from low-income families. Low-income status is defined differently for different cities based on available data. New Orleans data come from an imputation of race and ethnicity based on student's home location. See appendix C for more details.
† = Sample does not meet reporting standards.

TABLE A.3

Descriptive Data for Sixth-Grade Students

For three of our five study cities

	Overall	White	Black	Hisp	Asian	NonLow	LowInc	TPS	Charter
Sample size									
Denver	4,462	1,001	577	2,564	†	1,161	3,301	2,616	1,846
Detroit	7,252	237	6,111	763	84	812	6,440	4,360	2,892
Washington, DC	4,658	641	3,506	309	80	619	4,039	2,830	1,828
Average driving duration (minutes, in traffic)									
Denver	9	10.1	10.8	8.7	†	10	9.1	9.8	8.6
Detroit	7	5	7.6	6.9	6	8.7	7.3	6.4	9.0
Washington, DC	13	11.2	13.2	10.3	11.6	14.1	12.5	11.5	14.6
Share of students attending nearest school									
Denver	17%	16%	12%	18%	†	17%	17%	20%	13%
Detroit	25%	43%	25%	16%	57%	20%	26%	29%	19%

	Overall	White	Black	Hisp	Asian	NonLow	LowInc	TPS	Charter
Washington, DC	21%	36%	19%	13%	30%	34%	19%	28%	10%
Average number of schools within 10 minutes of driving in traffic									
Denver	8	7	8	7	†	7	8	7	8
Detroit	17	13	18	13	14	17	17	17	17
Washington, DC	9	10	11	17	9	9	11	10	12

Sources: Analysis of student-level data from Denver Public Schools, the Michigan Department of Education, the Center for Educational Performance and Information, the Louisiana Recovery School District, the New York City Department of Education, and the District of Columbia Public Schools, and the Washington, DC, Public Charter School Board.
Notes: Hisp = Hispanic; LowInc = students from low-income families; NonLow = students not from low-income families. Low-income status is defined differently for different cities based on available data. See appendix C for more details.
† = Sample does not meet reporting standards.

TABLE A.4

Descriptive Data for Ninth-Grade Students

For our five study cities

	Overall	White	Black	Hisp	Asian	NonLow	LowInc	TPS	Charter
Sample size									
Denver	3,103	568	416	1,903	†	712	2,391	2,383	720
Detroit	7,000	261	5,969	628	111	1,158	5,842	4,962	2,038
New Orleans	2,130	111	1,994	†	†	90	1,175	†	†
New York City	75,320	9,050	22,480	31,568	11,076	17,711	57,609	71,269	4,051
Washington, DC	5,994	728	4,807	234	71	856	5,138	4,298	1,696
Average driving duration (minutes, in traffic)									
Denver	12.0	12.2	17.1	10.6	†	13.4	11.6	12.9	8.9
Detroit	11.0	7.9	11.6	8.4	11.6	12.1	11.0	11.4	10.7
New Orleans	13.2	15.6	13.0	†	†	15.8	12.4	†	†
New York City	18.0	15.9	19.6	17.2	18.2	18.6	17.7	18.0	16.6
Washington, DC	16.0	14.1	16.2	11.1	14.0	19.8	15.0	15.9	15.3
Share of students attending nearest school									
Denver	19%	27%	10%	19%	†	17%	24%	18%	21%
Detroit	11%	32%	9%	17%	18%	8%	11%	9%	16%
New Orleans	13%	4%	14%	†	†	12%	13%	†	†
New York City	9%	19%	5%	7%	12%	11%	8%	9%	6%
Washington, DC	11%	18%	9%	17%	25%	11%	11%	10%	11%
Average number of schools within 10 minutes of driving in traffic									
Denver	6	5	5	6	†	5	6	6	6
Detroit	12	10	11	14	7	11	11	11	11
New Orleans	4	3	4	†	†	3	4	†	†
New York City	12	6	14	13	7	3	4		
Washington, DC	6	5	8	8	6	6	8	8	8

Source: Urban Institute analysis of student-level data.
Note: Hisp = Hispanic; LowInc = Students from low-income families; NonLow = Students not from low-income families. Low-income status is defined differently for different cities based on available data. New Orleans data come from an imputation of race and ethnicity based on student's home location. See appendix C for more details.
† = Sample does not meet reporting standards.

Appendix B. City Maps

FIGURE B.1

Denver's Average Driving Times for Ninth-Grade Students

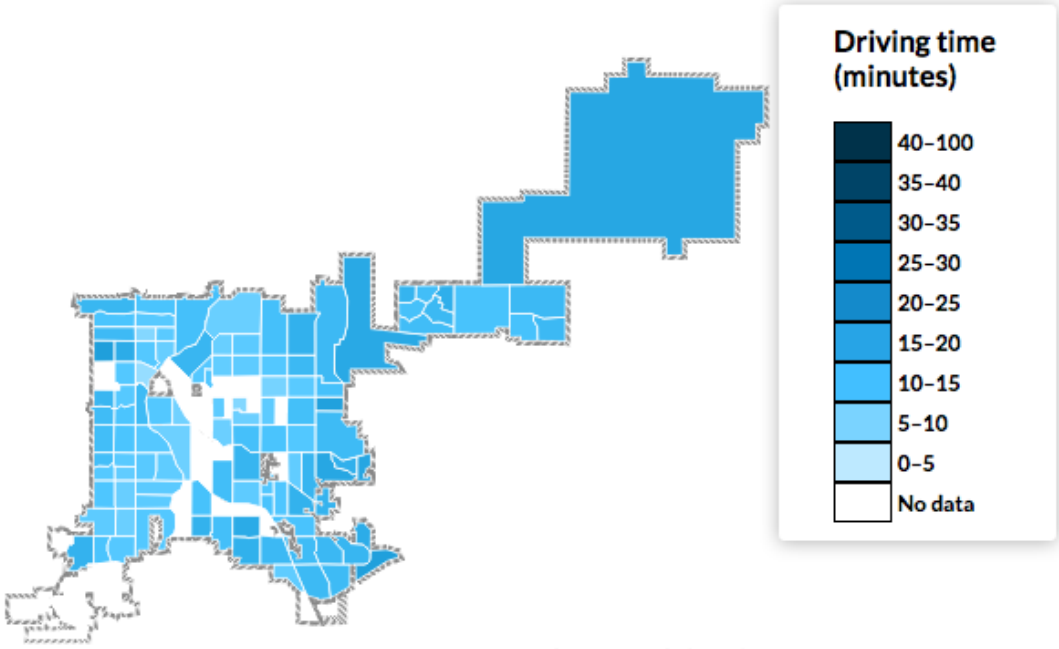


FIGURE B.2

Detroit's Average Driving Times for Ninth-Grade Students

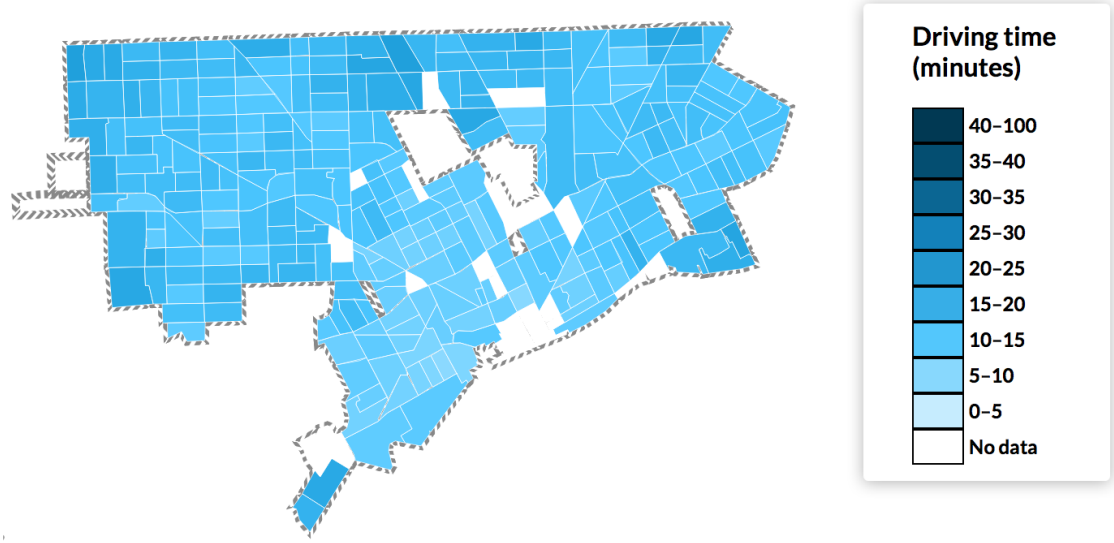


FIGURE B.3

New Orleans's Average Driving Times for Ninth-Grade Students

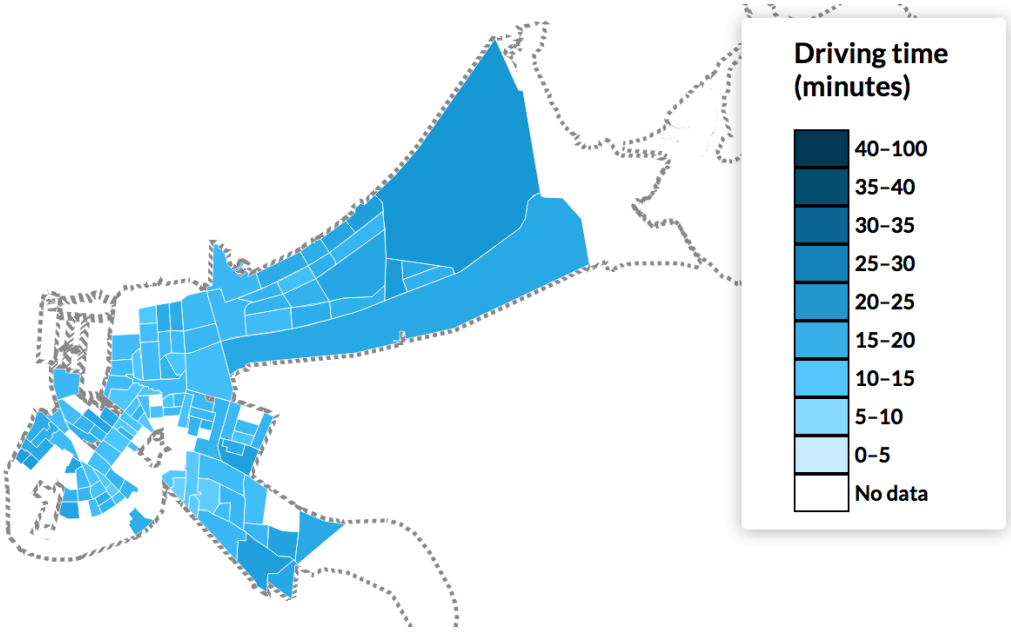


FIGURE B.4

New York City's Average Driving Times for Ninth-Grade Students

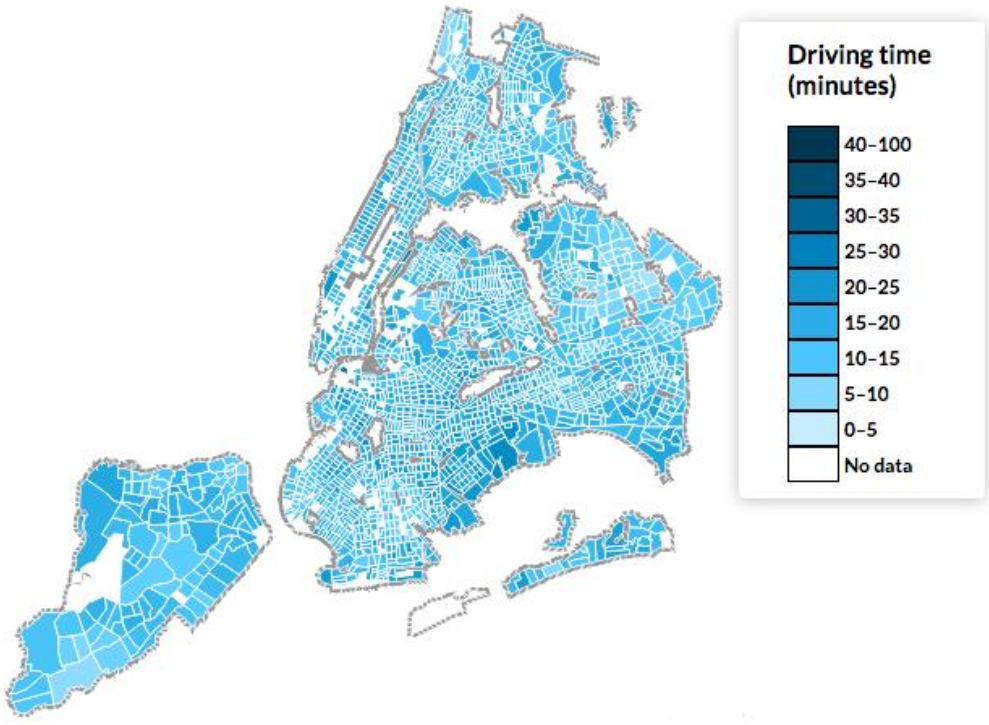
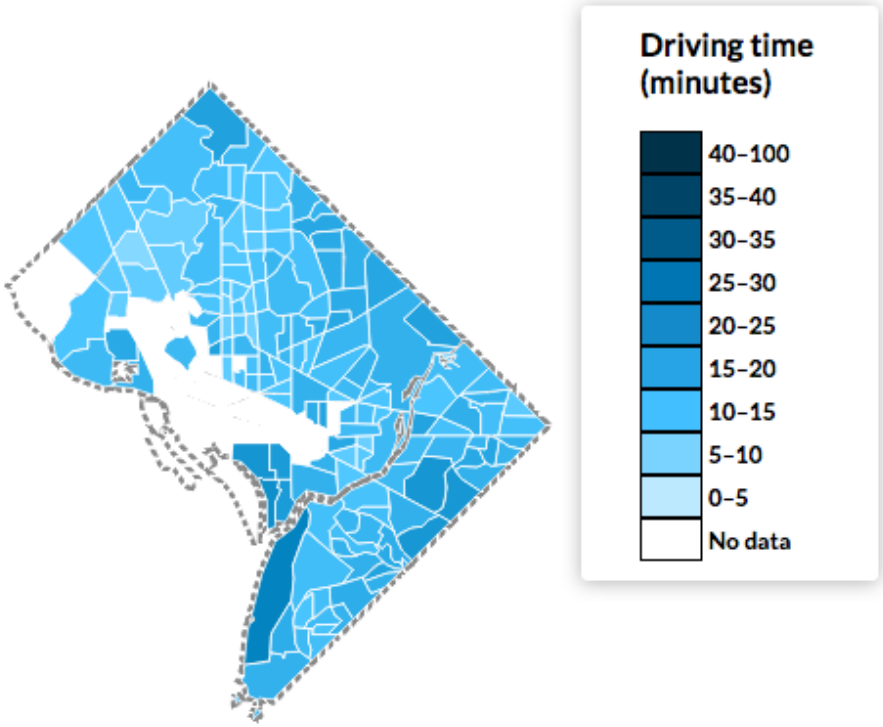


FIGURE B.5

Washington, DC's, Average Driving Transportation Times for Ninth-Grade Students



Appendix C. City Methodologies

Denver

We link administrative data from Denver Public Schools (DPS) with information about the region's public transit system. The data from DPS include a record for every student whose parent submitted a school choice application in the spring of 2014 for entrance into the sixth or ninth grade and whose application contains a valid (nonmissing) home address. These data include information about students' race and ethnicity, family income (i.e., free or reduced-price lunch status), special education and English language learner status, and gender, as well as the school they currently attend and the schools ranked by their family on their school choice applications.

School-level data come from a variety of sources: (1) geographic and programmatic (e.g., whether a school is a charter school) information comes from the US Department of Education's Common Core of data; (2) four-year graduation rates for the 2013–14 school year from the CO Department of Education. In total, our data consisted of residential and demographic information for roughly 8,000 students. We geocoded students' residential addresses to 2010 Census blocks. We matched these students to every public school in the district that was open in the 2014–15 school year, contained the student's next grade level, and made no obvious restrictions to their student body (for example, boys were not matched to an all-girls school). Our final dataset contained about 460,000 student-school records.

Detroit

Our sample of sixth and ninth-grade students is from the 2013–14 school years and is sourced from the Michigan Department of Education (MDE) and the Center for Educational Performance and Information (CEPI). We restrict the sample to students who live within the boundary of Detroit Public Schools (DPS) and attended a traditional public school or a charter school within the district boundaries of DPS. If student appears multiple times in the dataset in one year because of multiple home addresses or schools attended, we use first observation in the dataset. We did not have information on which school the student attended first.

For distances within a 2-mile radius (as the "crow flies"), drive time was calculated from the center of each students' home census block to the center of each school census block. For distances further than 2 miles, distance was calculated from the center of each students' home census tract to the center school census tract.

Disclaimer

This research result used data collected and maintained by MDE and/or CEPI. Results, information and opinions solely represent the analysis, information, and opinions of the author(s) and are not endorsed by, or reflect the views or positions of, grantors, MDE and CEPI or any employee thereof.

New Orleans

Data for student-level New Orleans analyses come from the Recovery School District (RSD) and Louisiana Department of Education (LDOE). We report data for kindergarteners and ninth-grade students, the transition grades for most New Orleans schools, who applied for schools through the city's unified enrollment system, the OneApp, for the 2013–14 school year. Students are assumed to have enrolled at the school they were assigned to in the final round of OneApp assignment.

State administrators report that 79 percent of New Orleans public schools were available in the OneApp for the 2013–14 year (EnrollNOLA 2016). All OneApp schools in 2013–14 offered open enrollment to students across the city, with no selective admissions. Notably, several of the city's highest-performing, highest-demand public schools (both with and without admissions requirements) were not available in the OneApp at that time. Private schools that participated in the state voucher program, the Louisiana Scholarship Program (LSP), also appeared in the OneApp. The students who applied for private schools through the OneApp are included in these analyses (e.g., in identifying where students live in the city). The private schools are not included in these analyses (e.g., in identifying where schools operate in the city). The OneApp was the primary access point for public schools, so the OneApp data used for this report contain observations for the vast majority of students who enrolled in public schools. Students who enrolled in an LSP-participating private school without receiving a voucher themselves might not have participated in the OneApp and therefore might not appear in these data.

Our OneApp data do not include information about students' race, ethnicity, or family income. For the subgroup analyses in this report, the New Orleans data are disaggregated based on the characteristics of the census block groups in which students live. Census block group information comes from the five-year estimates of the 2011–15 American Community Survey (ACS). For race and ethnicity, we disaggregate by whether the plurality of a census block's population is black (non-Hispanic/Latino), white (non-Hispanic/Latino), Asian (non-Hispanic/Latino), or Hispanic/Latino. For family income, we calculated the percentage of each census block group's population that had received benefits from the Supplemental Nutrition Assistance Program (SNAP, also known as food stamps) in the past 12 months. We then divided all Louisiana census block groups into quartiles. We disaggregate results by these quartiles based on where students lived. For some students, characteristics of their block group (e.g., the plurality race and ethnicity) likely does not match the student's characteristics (e.g., the student race and ethnicity).

In the analyses that disaggregate by charter and traditional school, we classify Orleans Parish School Board (OPSB) direct-run schools (n = 6) and RSD direct-run schools (n = 2) as traditional. OPSB direct-run schools were managed by the local school board. RSD schools were managed, temporarily, by the RSD (a state agency). Both OPSB and RSD direct-run schools were schools of choice (i.e., they did not have neighborhood attendance zones or selective admission) but generally had less school-level autonomy than the city's charter schools.

New York City

This analysis draws on several administrative data sources from the NYC Department of Education (NYCDOE): (1) residential census blocks, demographics, and programmatic information for kindergarten and ninth-grade students enrolled in NYC public schools; and (2) addresses, census blocks, descriptive characteristics, and performance measures for all NYC public schools. All data are from the 2013–14 school year.

Residential census blocks were identified using Geosupport Desktop Edition software from the NYC Department of City Planning. This software is the official geocoder of the city government and is generally better at parsing unusual NYC addresses than other available packages. Students in these analyses include charter school students but exclude students enrolled in alternative schools or schools that exclusively serve students with disabilities (District 79 and 75 schools, respectively). We use ArcGIS and census block boundary files to assign geocoded addresses to 2010 Census block IDs. The

162,625 unique students across both grades were located in 23,804 unique census blocks (19,845 for kindergarten and 19,863 for ninth grade, not mutually exclusive).

Enrollment data from the NYCDOE Demographic Snapshot are used to identify schools offering either kindergarten or ninth grade. Schools in these analyses again exclude alternative and special education schools. School addresses from March 2014 are obtained from the NYCDOE Location Code Generation Management System (LCGMS). Using an online geocoding tool, we obtain spatial coordinates (latitude and longitude) and 2010 Census block IDs for the 1,406 unique schools serving kindergarten or ninth grade. These schools are located in 1,056 unique census blocks (821 for kindergarten and 306 for ninth grade, not mutually exclusive).

Calculating travel time between all unique home and school block combinations would be computationally intensive and expensive. (There are roughly 25 million unique block pairs for the two grades combined.) To reduce the scope of this analysis, we first eliminate kindergarten block pairs in different boroughs. This decision is justified given that most kindergarten students (97.8 percent) in NYC attend their residentially zoned school in the same borough. Eliminating pairs in different boroughs significantly reduces the total number of block pairs from 25.1 to 9.7 million. We do not make this restriction for ninth-graders since many attend a school outside of their borough of residence.

To reduce the number of combinations further, we calculate the straight-line distance between centroids of each student and school block. If the straight-line distance is more than 5 miles (for kindergarten pairs) or more than 10 miles (for ninth-grade pairs), the block pair is eliminated, under the assumption that students in these grades would not travel that far to school. (The 95th percentile of straight-line distance between home and current school for ninth-graders is 9 miles. For kindergarten, it is 2.2 miles. Thus, trips this far are very rare in the data.) This further reduced the total number of block pairs from 9.7 to 5.7 million.

For the remaining block pairs, we calculate travel time between student and school using block centroids when the straight-line distance was less than 1 mile. When the straight-line distance is 1 mile or more, we calculate travel time between student and school blocks using tract centroids. Because tracts encompass a larger land area than blocks, this markedly reduces the number of required calculations. For a random sample of 500 block pairs, we compare the travel time calculated using block and tract centroids. For driving time, the correlation was 0.987. For public transit time, the correlation was 0.981.

Washington, DC

Data for student-level Washington, DC, analyses come from the District of Columbia Public Schools (DCPS) and from the District of Columbia Public Charter School Board (PCSB). We report data for all kindergarteners, sixth-graders, and ninth-graders who were enrolled in either traditional or charter schools in DC in the 2013–14 school year.

In cases where students are enrolled in more than one school over the course of the school year, we record the first enrollment, by entry date, as the enrollment for which we calculate travel distance and times. We exclude students who are recorded as attending schools outside the district or who report non-DC addresses. A very small number of students (fewer than 10) were recorded as enrolled in a school that does not offer the grade that they are enrolled in; these students were also excluded from the analysis.

A student's low-income status is recorded as receiving free or reduced-price lunch in the 2013–2014 enrollment year. A student is recorded as a charter school student if their first recorded enrollment is a charter school.

Notes

1. Digest of Education Statistics 2015, table 206.40.
2. Max Larkin, "After BPS Reschedules School Start Times by Computer, Parents Push Back," *WBUR* December 10, 2017, http://www.wbur.org/edify/2017/12/09/bps-reschedules-start-times-parents-push-back.
3. Although not a focus of our study (we only have access to data on enrollment in public schools), two of our cities also have publicly funded private-school choice. Since 2004, low-income students living in Washington, DC, have been able to access private schools through vouchers provided by the federally funded DC Opportunity Scholarship Program. Through state programs, low-income New Orleans students may have access to private schools through vouchers provided through the Louisiana Scholarship program (created in 2008) and via donated scholarships through the Louisiana Tuition Donation Rebate Program (starting in 2012). In addition, all families in Louisiana are able to claim tax deductions for private school expenses under the Elementary and Secondary School Tuition Deduction program (enacted in 2008).
4. In Detroit and New York City, distant schools were measured using tract-to-tract centroids, to reduce the number of calculations required. See appendix for more details on each city.
5. High school resources are as reported from the US Department of Education's Office for Civil Rights Data Collection from 2013–14.

References

Blackmon, Bret J., and Daphne S. Cain. 2015. "Case Manager Perspectives on the Effectiveness of an Elementary School Truancy Intervention." *School Social Work Journal* 40 (1): 1–22.

Bloom, Howard S., and Rebecca Unterman. 2014. "Can Small High Schools of Choice Improve Educational Prospects for Disadvantaged Students?" *Journal of Policy Analysis and Management* 33 (2): 290–319.

Burdick-Will, Julia, Micere Keels, and Todd Schuble. 2013. "Closing and Opening Schools: The Association between Neighborhood Characteristics and the Location of New Educational Opportunities in a Large Urban District." *Journal of Urban Affairs* 35 (1): 59–80.

Burdick-Will, Julia. 2015. "School Choice, Neighborhood Income, and Educational Heterogeneity." Presented at American Sociological Association Annual Meeting, Chicago, IL, August 24.

Canfield, James P., Joseph Nolan, Dana Harley, Ashley Hardy, and Willie Elliott. 2016. "Using a Person-Centered Approach to Examine the Impact of Homelessness on School Absences." *Child and Adolescent Social Work Journal* 33 (3): 199–205.

Carrell, Scott E., Teny Maghakian, and James E. West. 2011. "A's from Zzzz's? The Causal Effect of School Start Time on the Academic Achievement of Adolescents." *American Economic Journal: Economic Policy* 3 (3): 62–81.

Denice, Patrick, and Betheny Gross. 2016. "Choice, Preferences, and Constraints: Evidence from Public School Applications in Denver." *Sociology of Education* 89 (4): 300–20.

Edwards, Finley. 2012. "Early to Rise? The Effect of Daily Start Times on Academic Performance." *Economics of Education Review* 31 (6): 970–83.

EnrollNOLA. 2016. *EnrollNOLA Annual Report*. New Orleans: EnrollNOLA.

Glazerman, Steven, and Dallas Dotter. 2017. "Market Signals: Evidence on the Determinants and Consequences of School Choice from a Citywide Lottery." *Educational Evaluation and Policy Analysis* 39 (4): 593–619.

Glomm, Gerhard, Douglas Harris, and Te-Fen Lo. 2005. "Charter School Location." *Economics of Education Review* 24 (4): 451–57.

Grossman, Jean Baldwin, Karen Walker, and Rebecca Raley. 2001. "Challenges and Opportunities in After-School Programs: Lessons for Policymakers and Funders." Philadelphia: Public/Private Ventures.

Gurley, Tami, and Donald Bruce. 2005. "The Effects of Car Access on Employment Outcomes for Welfare Recipients." *Journal of Urban Economics* 58 (2): 250–72.

Jacob, Brian A., and Jonah E. Rockoff. 2011. "Organizing Schools to Improve Student Achievement: Start Times, Grade Configurations, and Teacher Assignments." Washington, DC: Brookings Institution.

Jacobs, Nicholas, 2013. "Understanding School Choice: Location as a Determinant of Charter School Racial, Economic, and Linguistic Segregation." *Education and Urban Society* 45 (4): 459–82.

Jochim, Ashley, Michael DeArmond, Betheny Gross, and Robin Lake. 2014. *How Parents Experience Public School Choice*. Seattle: Center on Reinventing Public Education.

Noland, Robert B., and Kenneth A. Small. 1996.*Travel-Time Uncertainty, Departure Time Choice, and the Cost of the Morning Commute*. Institute of Transportation Studies, University of California, Irvine.

Ong, Paul M., 2002. "Car Ownership and Welfare-to-Work." *Journal of Policy Analysis and Management* 21 (2): 239–52.

Pendall, Rolf, Christopher Hayes, Arthur (Taz) George, Zach McDade, Casey Dawkins, Jae Sik Jeon, Eli Knapp, Evelyn Blumenberg, Gregory Pierce, and Michael Smart. 2014. *Driving to Opportunity: Understanding the Links*

among Transportation Access, Residential Outcomes, and Economic Opportunity for Housing Voucher Recipients. Washington DC: Urban Institute.

Schwartz, Amy Ellen, Leanna Stiefel, and Matthew Wiswall. 2013. "Do Small Schools Improve Performance in Large, Urban Districts? Causal Evidence from New York City." *Journal of Urban Economics* 77:27–40.

Teasley, Martell L. 2004. "Absenteeism and Truancy: Risk, Protection, and Best Practice Implications for School Social Workers." *Children & Schools* 26 (2): 117–28.

Tyson, Will, Reginald Lee, Kathryn M. Borman, and Mary Ann Hanson. 2007. "Science, Technology, Engineering, and Mathematics (STEM) Pathways: High School Science and Math Coursework and Postsecondary Degree Attainment." *Journal of Education for Students Placed at Risk* 12 (3): 243–70.

Wahistrom, Kyla. 2002. "Changing Times: Findings from the First Longitudinal Study of Later High School Start Times." *NASSP Bulletin* 86 (633): 3–21.

Wolfson, Amy R., Noah L. Spaulding, Craig Dandrow, and Elizabeth M. Baroni. 2007. "Middle School Start Times: The Importance of a Good Night's Sleep for Young Adolescents." *Behavioral Sleep Medicine* 5 (3): 194–209.

Urban Institute Student Transportation Working Group. 2017. *Student Transportation and Educational Access: How Students Get to School in Denver, Detroit, New Orleans, New York City, and Washington, DC*. Washington, DC: Urban Institute.

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