

Research and Analysis Conducted
by Reinvestment Fund

Commissioned by the Bainum
Family Foundation

November 2018



— Early Learning —
Supply & Demand

— in the District of Columbia —

USING DATA TO IDENTIFY CRITICAL GAPS

Acknowledgments

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Finding — and Fixing — the Gap in D.C. Early Learning

The first three years of a child's life shape every year afterward. This unique developmental window, when 85% of brain growth occurs, lays the foundation for all future learning, behavior and health, putting a child on a trajectory toward success in school and life or, in too many cases, a future in which the child does not fulfill his or her full potential.

This is why the Bainum Family Foundation has made early learning one of its primary focus areas, investing upwards of \$20 million over the past three years to improve early childhood in the District of Columbia. We know that high-quality early learning is critical to a child's healthy development and long-term well-being. But we also know that children living in poverty and children of color often don't have access to the same supports and resources as their counterparts in more affluent neighborhoods.

Our Foundation set a goal of adding 750 high-quality early learning seats for infants and toddlers in the District's Wards 7 and 8 by 2020, and we have worked collaboratively with District government and many committed partners to make it happen through a range of practice, policy and research improvements.

But programs and investments, to be most effective, need to be data-informed. And until now, there has been insufficient data to help answer critical questions about the availability of high-quality early learning seats in D.C.

And so, I am pleased to present "Early Learning Supply and Demand in the District of Columbia: Using Data to Identify Critical Gaps." Commissioned by the Foundation and conducted by our partner, Reinvestment Fund, this analysis provides the first comprehensive look at what the District has, and what it lacks, in early learning capacity and quality — and the parts of our community most affected by dramatic gaps between supply and demand as they



relate to quality early learning opportunities for infants and toddlers.

These findings will guide both current and future investments by the Foundation, the District and others committed to building a more prosperous and equitable future for the District's youngest residents. This report focuses primarily on the findings and implications for infants and toddlers (defined as birth up to age 3), but we also collected and analyzed data for 3- and 4-year-olds, and the appendix contains insights for this "0 to 5" age range as well.

We thank all who contributed to this important report, and we welcome your continued partnership as we work to ensure the success of all our children.

Barbara Bainum, LCSW-C

Chair of the Board, CEO and President

Table of Contents

- 7 Introduction
- 8 Background and Context
- 12 Methods and Data Collection
- 14 Calculating Estimates of Demand (For Ages 0 to 3)
- 17 Calculating Estimates of Supply (For Ages 0 to 3)
- 20 Comparing Estimates of Supply and Demand (For Ages 0 to 3)
- 25 Conclusions and a Blueprint for Action

Appendices

- 27 Appendix I: Stakeholder Group Participants
- 28 Appendix II: A Broader Look at Early Learning Supply and Demand (For Ages 0 to 5)
- 39 Appendix III: Methodology



Introduction

In 2015, the Bainum Family Foundation released *Infants and Toddlers in the District of Columbia: A Statistical Look at Needs and Disparities*,¹ a landmark study of the challenges facing infants and toddlers (i.e., children under age 3) in the District of Columbia. Its central finding: Life in the District is a tale of two cities for young children, with wide disparities in the factors that shape their healthy development. From prenatal care and job training for parents to home visiting and high-quality early learning for children, the systems that nurture and support some District infants and toddlers fail to reach or fully support others.

These disparities are not random, the authors concluded. Rather, they are a function of race and income. The authors found that support systems were much less robust for young children in Ward 7 and Ward 8, east of the Anacostia River – where residents are more likely to be African-American and more likely to face poverty – than for their counterparts in other parts of the District.

To address these disparities, the Foundation and its partners have set out to better understand where and to what extent additional service investments are needed, particularly in the area of high-quality early learning.

Estimating the demand and supply of high-quality early learning is a difficult task due to several factors:

- Limited data is available on how many District parents choose to remain home with their children or whether the children receive private care (e.g., from a relative, neighbor, friend or privately hired nanny or au pair) that is not subject to government regulation; therefore, data on supply, demand, location and quality of these arrangements is very limited.

- Commuters entering, exiting and moving around the District have an impact on demand that is difficult to track.
- Data on quality is limited to only those providers (e.g., those receiving public subsidies or public charter schools) that tend to operate in low-income communities, thereby creating an appearance of oversupply in those neighborhoods.

Given these challenges, a perfect estimate of supply, demand and shortages of high-quality early learning cannot be produced with available data. However, given that policymakers must make decisions based on the best information available, the Foundation commissioned the Reinvestment Fund to produce “Early Learning Supply and Demand in the District of Columbia: Using Data to Identify Critical Gaps.” This research brief a) presents a conceptual model for considering the complex factors that drive supply, demand and the shortages and surpluses that occur when they are out of balance; b) provides an illustrative example of how this model can be used, based on existing data; and c) highlights where additional data is needed in order to develop even more precise estimates of supply and demand.



Background and Context

The first three years of a child’s life represent a unique and powerful developmental opportunity, one that lays the foundation for all future learning, behavior and health. When a child’s early years are marked by the “toxic stress” associated with poverty, and support systems fail to nurture the child during this critical window, the consequences reverberate throughout childhood and into adulthood.

High-quality early learning does not erase the impact of homelessness, hunger or unmet health needs during a child’s first years. However, age-appropriate cognitive and social development paired with a safe learning environment, nutritious food and connections to physical and emotional health care can lessen the impact of childhood adversity.

Research indicates that high-quality early learning for young children can improve the odds of success in nearly every aspect of life, from better social and working relationships to higher earnings and lower health burdens. Long-term dividends range from improved academic performance and higher high school graduation rates to better physical health.²

The groundbreaking work of Nobel prize-winning economist James J. Heckman, PhD, shows that high-quality birth-to-5 programs for disadvantaged children can deliver a 13% per year return on investment by creating better education, health, social and economic outcomes that increase revenue and reduce the need for costly social spending.³

The District of Columbia Has Demonstrated Leadership and Progress

The District has made significant progress in strengthening support systems for young children – in fact, it has laid the groundwork for a comprehensive, integrated and sustainable set of supports for infants and toddlers and their families in the District. Credit for these gains goes to an engaged Council of the District of Columbia and the committed

administration of Mayor Muriel Bowser, as well as the many advocacy, service and philanthropic organizations working tirelessly on behalf of children and families across the District.

The Foundation has collaborated with all these partners, offering information, ideas and financial and technical support.

More recently, both the Foundation and the District initiated major plans to increase the availability and quality of early learning facilities. The Foundation is partnering with Reinvestment Fund to launch a new Early Learning Quality Fund (ELQF) that will commit \$3.8 million toward facility improvements to produce 600 additional high-quality early learning seats in Ward 7 and Ward 8. Mayor Bowser has committed \$9 million to create more than 1,000 high-quality early learning seats Districtwide, making facilities available in District-owned buildings and through grants and capital loans administered by the Low Income Investment Fund (LIIF).

Most recently, in June of 2018 the Council of the District of Columbia enacted the *Birth-to-Three for All DC Act of 2018*, which charts the path for a comprehensive system of supports for children’s healthy growth and development, including full funding of the child care subsidy program,

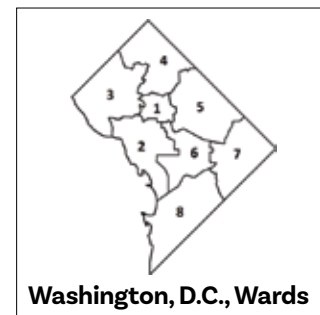


Exhibit 1: Ward Demographic Profile, Washington, D.C.

	Median Household Income	Percentage of Children (Under 18) Living in Poverty	Race/Ethnicity			
			Percentage of Population Black/African-American	Percentage of Population Hispanic	Percentage of Population White	Percentage of Population Other
All D.C.	\$66,297	26.7%	47%	10%	36%	6%
Ward 1	\$61,196	23.7%	29%	20%	44%	7%
Ward 2	\$189,324	6.1%	9%	11%	67%	13%
Ward 3	\$216,193	2.9%	7%	11%	73%	10%
Ward 4	\$93,592	16.3%	53%	20%	22%	5%
Ward 5	\$60,351	21.3%	67%	9%	19%	4%
Ward 6	\$122,500	16.5%	33%	6%	53%	7%
Ward 7	\$31,273	39.9%	93%	4%	2%	2%
Ward 8	\$24,096	49.6%	90%	3%	5%	2%

Sources: DC Action for Children Ward Snapshots (2017); U.S. Census Bureau, 2011-2015 American Community Survey

competitive compensation for early educators, and better access to health services and family supports. By passing this bill, the District continues national leadership in supporting our youngest children. This builds on the success of universal pre-kindergarten in the District.

subsidy, a typical household in D.C. would need to pay 35% of its annual income to afford center-based early learning for one child. But for single-parent families and those earning at or near the federal poverty line, the cost of care may be even more extreme. A typical single parent with one child living at

Economically Disadvantaged Communities Face Significant Challenges in Accessing High-Quality Early Learning

Race, geography and income play important roles in the ability of families to access and afford high-quality early learning for their children. As Exhibit 1 shows, there are great differences among the wards of Washington, D.C.

Access to high-quality early learning supports for low-income families is affected by many factors, including cost. Across the District, the average annual cost of a center-based early learning program is \$23,089.⁴ Meanwhile, the “Ward Snapshots” released last year by the children’s advocacy group DC Action for Children reported that median household income for families with children varies from approximately \$31,000 and \$24,000 annually in Wards 7 and 8, respectively, to upwards of \$216,000 in Ward 3.⁵

For the District as a whole, median family income among parents with children is \$66,297. That means, absent any

Defining High-Quality Early Learning

High-quality early learning can improve the odds for young children, especially those born into adversity. The Bainum Family Foundation embraces Early Head Start standards, defining early learning as “high quality” if it:

- Exposes every child to rigorous cognitive learning
- Fosters lifelong learning through a focus on social, emotional and physical growth
- Has highly trained instructional staff and strong leadership
- Takes place in a safe, healthy, comfortable educational space that supports diverse learning and teaching
- Encourages and has systems to support family engagement

the federal poverty line would need to spend 89% of the family's income to afford early learning for one child, and a two-parent household with two children living at the federal poverty line would need to spend 170% of their income to afford early learning.

But even for those households living near or above the federal poverty line, the cost of care can far exceed 30% or even 50% of annual income. Exhibit 2 shows the areas of the District where the average annual cost of a center-based early learning program exceeds 30% and 50% of the median household income in the census block group. In much of Wards 7 and 8 and parts of Ward 6, the annual cost of an average early learning program exceeds 30% of median household income if the household has just one child in a program that does not accept a subsidy. (See Exhibit 3.)

Exhibit 3 shows the number of infants and toddlers living in block groups where the average cost of a center-based program would exceed 10%, 30% and 50% of family income. Across the District of Columbia, 32% of infants and toddlers live in a block group where the cost of a center-based program exceeds 50% of median household income.

Although low-income families in these areas may be eligible for public subsidies that help defray the cost of care, the capacity of subsidized programs is limited (see page 18 for a discussion of subsidized capacity in D.C.). Many of the areas with the lowest ability to afford infant/toddler early learning also have the highest demand for this support.

Location of Low-Wage Jobs

The location of low-wage jobs is another important factor that influences access to high-quality early learning opportunities for low-income families. As Exhibit 4 shows, people are working low-wage jobs throughout the District. The relatively small number of low-wage jobs in high-poverty areas, such as Wards 7 and 8, highlights the mismatch between where low-wage families live and where they seek employment. High-poverty neighborhoods, like those in Ward 7 and Ward 8, may have few jobs at any wage. What is clear from this map is that low-wage work opportunities are concentrated in the downtown area, especially in Wards 2 and 6. But there are also some significant concentrations of lower-wage jobs in some of the more affluent areas in Ward 3.

Exhibit 2: Areas Where Average Cost of Center-Based Early Learning Exceeds 30% of Median Household Income, Washington, D.C.

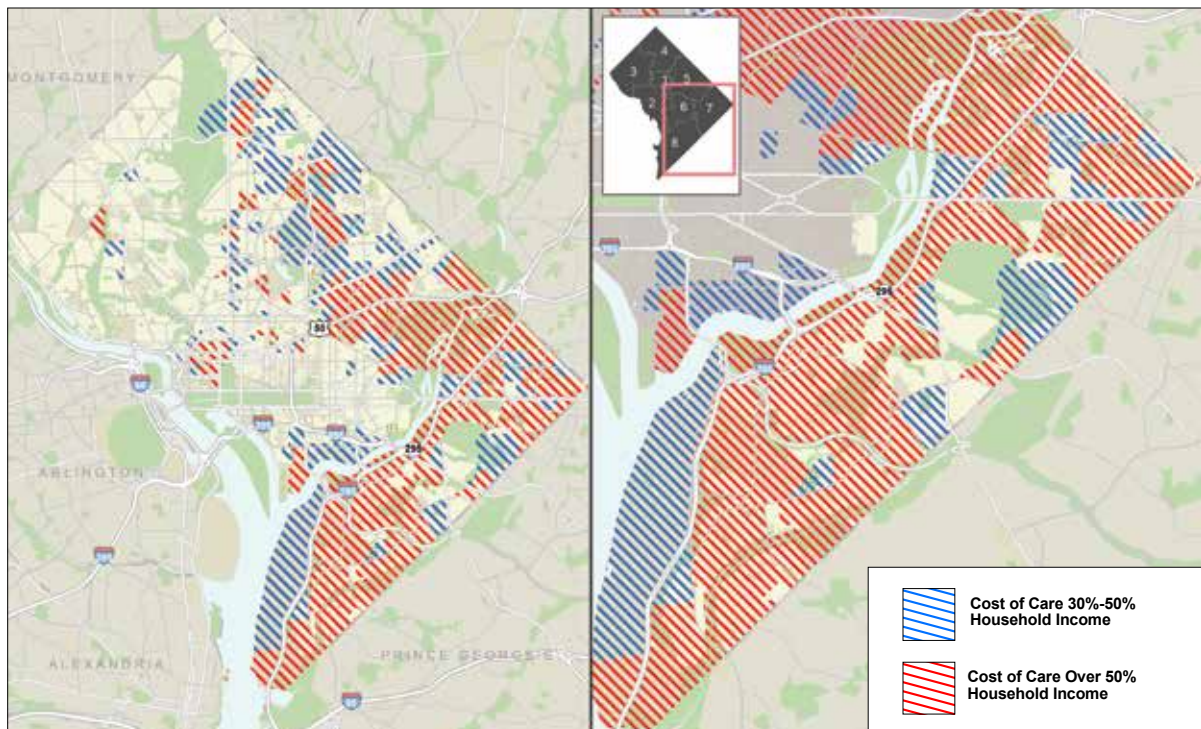
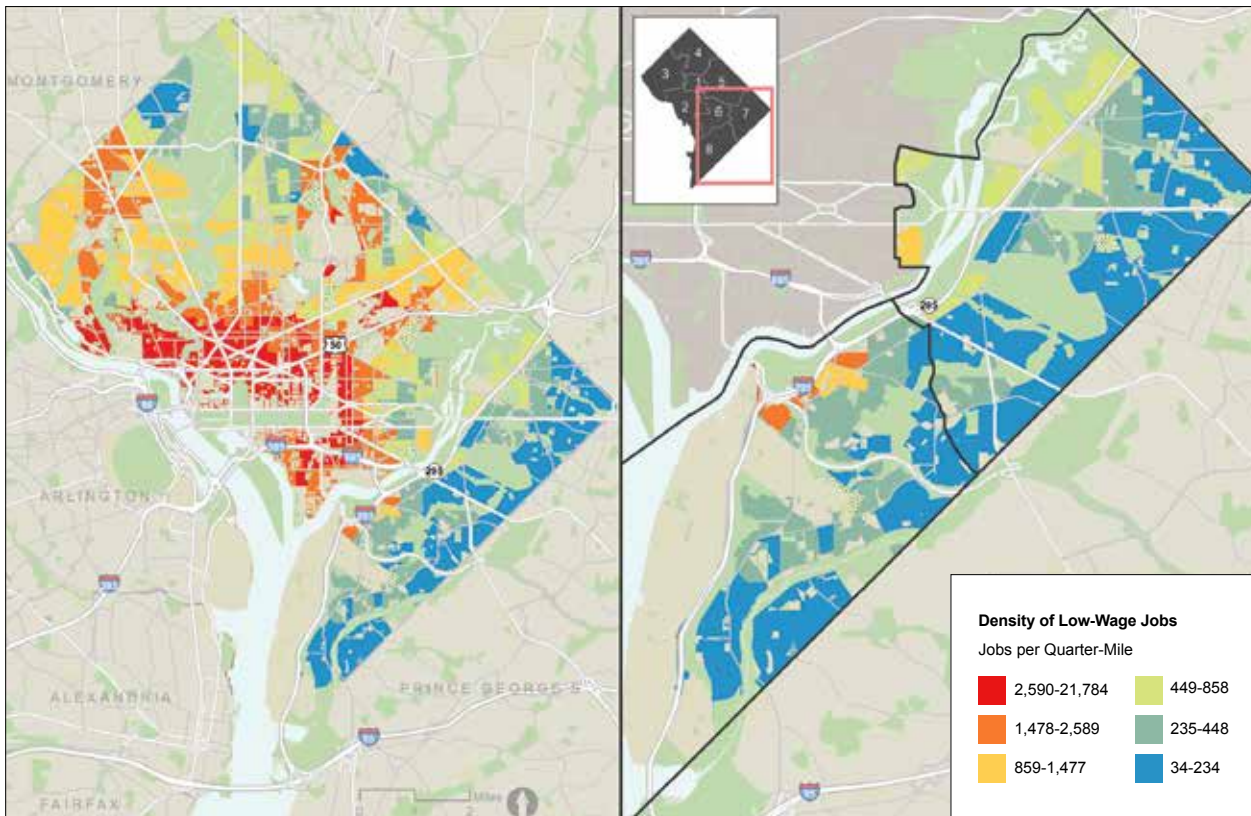


Exhibit 3: Population of Children 0 to 3, by Median Household Income and Cost of Early Learning, Washington, D.C.

	Number of Children Ages 0 to 3	Percentage of Children Ages 0 to 3
Cost of Care Is Less Than 10% of Median Income	1,603	6%
Cost of Care Is 10% to 30% of Median Income	10,928	40%
Cost of Care Is 30% to 50% of Median Income	4,872	18%
Cost of Care Is Over 50% of Median Income	8,769	32%
Median Income Unknown	984	4%
Total	27,157	100%

Source: American Community Survey, 2012-2016

Exhibit 4: Location of Low-Wage Jobs, Washington, D.C.



Source: Reinvestment Fund analysis of the US Census' Longitudinal Employer-Household Dynamics database, 2015



Methods and Data Collection

The estimation model presented in this research brief utilizes key data at the level of a census block group. Block groups are a U.S. Census-defined geography smaller than a census tract, but larger than a city block. Census block groups can be as small as 600 people, offering a much more detailed assessment of the need for high-quality early learning within and across District wards and neighborhoods.

Data Limitations

When studying supply and demand, several challenges are immediately apparent. To estimate supply, researchers must contend with limited data on the location and capacity of early learning programs. No individual data source contains a comprehensive listing of early learning programs in D.C.; therefore, evaluating the quality of programs, especially those not participating in Capital Quality, the District's official quality rating and improvement system (QRIS), presents additional challenges. When estimating demand, researchers must contend with limited information on parental preferences and the shifting dynamics of local markets, which may factor into how and where parents seek early learning.

In response to these challenges, the estimation model presented in this research brief is informed by numerous

consultations with local early learning experts and practitioners (the "Stakeholder Group"), who provided advice and guidance throughout the course of the analysis. Stakeholder Group members included representatives from a wide range of policy, research, advocacy and service-delivery organizations, as well as the Bainum Family Foundation.⁶

Reinvestment Fund worked with the Stakeholder Group to identify nine local datasets that, taken together, provided a list of formal, regulated or licensed early learning programs operating in the District. When combined, this data provides as close to a comprehensive list of early learning programs as is possible to achieve currently. Notably, however, this data does not capture care provided by relatives, neighbors, friends or in-home providers, such as nannies or au pairs. That said, in reviewing the results, stakeholders were confident that supply

“The estimation model presented in this research brief is informed by numerous consultations with local early learning experts and practitioners, who provided advice and guidance throughout the course of the analysis.”

estimates presented in the analysis provided the best available landscape of early learning in the District.

To measure demand, the Reinvestment Fund model incorporates population estimates from the American Community Survey and The Nielsen Company as well as parental commuting patterns described in the Longitudinal Employer-Household Dynamics survey conducted by the U.S. Census Bureau. The model combines population and commuting data to produce a statistical estimate of both residential demand in each census block group in the District, as well as the level of demand from parents seeking early learning near their place of work in each census block group in the District.

Consideration of commuting patterns is an important factor in a city like D.C., where a substantial number of workers commute to jobs in the District from the surrounding region. When making commuting adjustments, the analysis accounts for where parents live and work, as well as household size, income and family composition to capture family travel patterns that may affect demand for early learning.⁷

Throughout the process, the methods, assumptions and estimates underlying the supply and demand analysis were shared with the Stakeholder Group and vetted for completeness and accuracy.⁸

Quality Matters

Funders and policymakers are particularly interested in quantifying the quality of early learning programs. Working with the local Stakeholder Group, we identified three indicators that were generally agreed to designate an early learning program for infants and toddlers (ages 0 to 3) as high quality:

- Highly rated QRIS programs – Programs with Gold or Silver ratings under the District’s prior QRIS system, Going for the Gold
- Accredited programs – Programs holding accreditations from the National Association for the Education of Young

Children (NAEYC) or the National Association of Family Child Care (NAFCC)

- Head Start and Early Head Start – Programs that participate in Head Start or Early Head Start

A total of 166 of the District’s 382 early learning programs serving infants and toddlers met at least one of these definitions of high quality.

The District’s QRIS system (called Going for the Gold at the time of this analysis but updated more recently as Capital Quality) rates participating centers on a scale, but not every program in the District participates. One concern raised by the Stakeholder Group was that relying only on the District’s QRIS as an indicator of quality could bias the results. Because ratings on the District’s QRIS are at least partially tied to subsidies, looking only at programs rated highly on the District’s QRIS system could make it appear as if a disproportionate number of high-quality programs were located in low-income communities. The same concern exists for Head Start and Early Head Start programs, which only serve families in poverty.





Calculating Estimates of Demand (For Ages 0 to 3)

Not every parent seeks early learning in the same way, and one challenge in estimating the demand for early learning is that researchers lack information about parental preferences. Therefore, a conceptual model for estimating demand begins with estimating the maximum potential demand for early learning by examining the population of children living in and near D.C.

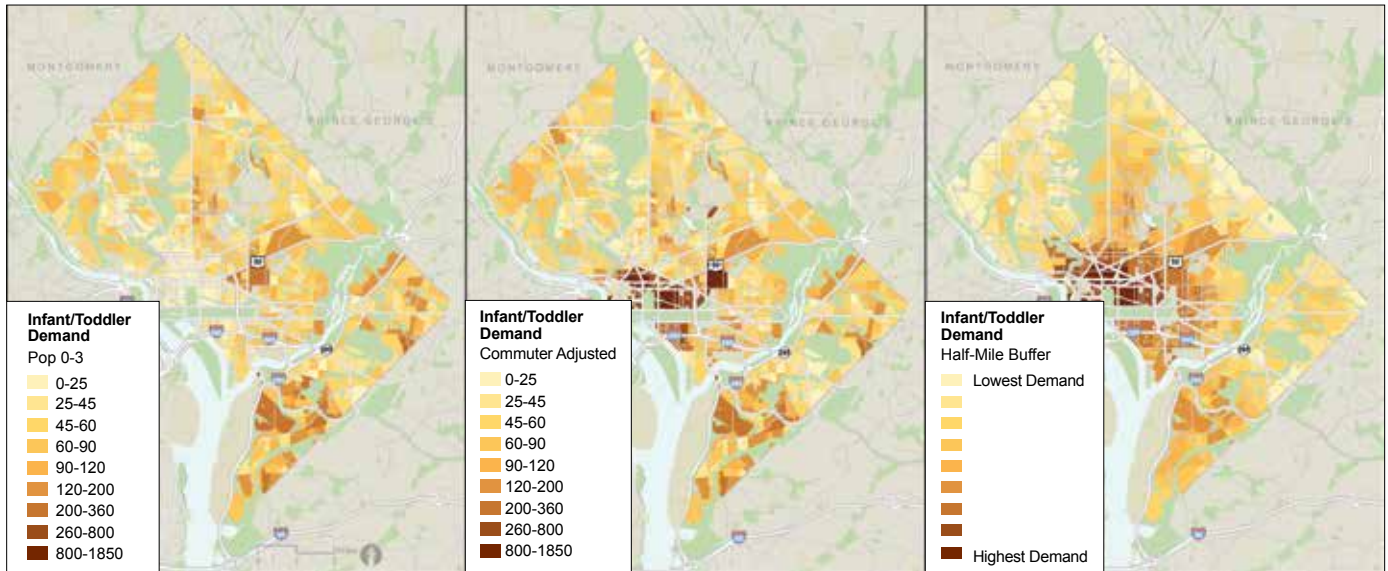
These estimates consider both those parents who seek early learning near their home and parents who seek early learning near their places of work, an important factor in a city like D.C., where a substantial number of workers commute to jobs in the District from the surrounding region. As such, these numbers include both residents and nonresident children whose parents live in the cities and towns surrounding the District.

Starting Point: Maximum Potential Demand Scenario

Estimates of maximum potential demand represent the total number of potential customers for infant and toddler early learning. This “maximum demand scenario” illustrates an assumption that there will need to be a seat for every child in the given age group – much like there is a spot for virtually every age-appropriate child in first grade. It includes resident children as well as those who commute into the District from other states (such as Maryland and Virginia) with their parent or guardian (adding to the total demand) as well as those who commute out (reducing the total demand). The process also moves children around within the District based on work and residence patterns of parents and guardians.

Using the approach described above, the following calculations illustrate how this conceptual model can be used to estimate maximum potential demand among residents and commuters. This scenario is not presented as a perfect estimate of demand in the District, but rather as an illustration of how the estimation model can be used with available data. For example, in 2017, there were an estimated 27,157 children ages 0 to 3 living in D.C. (See Exhibit 5, Map 1.) An estimated 4,307 infants and toddlers travel with adults to early learning programs located outside of D.C., near a parent’s place of work. In terms of commuters entering the District, it is estimated that 13,721 infants and toddlers who reside outside the District travel with parents to work locations inside D.C. and utilize programs located within the District. This estimate was calculated by analyzing age, employment and income of commuting parents with young children in the D.C. region. Estimates of the number of parents who could seek child care near their place of work are discounted by a factor of three to account for the findings that parents are more likely to seek care near home than near their place of work. The discount factor was chosen based on discussions with the Stakeholder Group and aligns with previous local and

Exhibit 5: Maximum Potential Demand for Infant and Toddler Early Learning (Ages 0 to 3), Washington, D.C.



Source: Reinvestment Fund

national research. For example, data from the Office of the State Superintendent of Education (OSSE) showed that 37% of families enroll children in District or charter school pre-K programs outside of their home ward. More broadly, a report on the early childhood education arrangements of working parents in Cook County, Illinois, found that 31% of parents with children in care have arrangements located on their way to work and 25% have arrangements that take them farther away from work.⁹

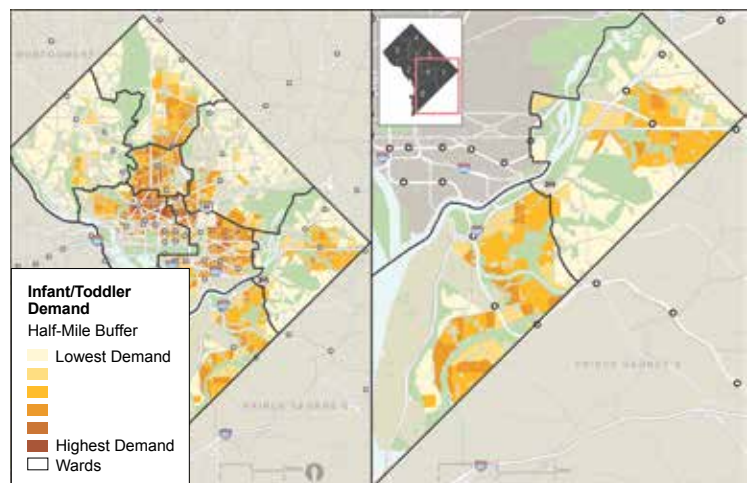
These adjustments yield a maximum potential universe of demand for 36,571 infant and toddler seats in D.C., including those commuting into the District from other states (See Exhibit 5, Map 2). Map 3 in Exhibit 5 shows the maximum potential demand within a half-mile of each census block group. Looking only at resident infants and toddlers, we estimate a maximum potential demand for 22,850 infant and toddler seats.

The maximum potential demand for early learning is not evenly distributed across the District. Exhibit 6 maps the estimated level of maximum potential demand for early learning for infants and toddlers across every census block group in the District. Values are normalized by land area to account for the varying sizes of each block group.¹⁰

Exhibit 7 shows the distribution of maximum potential demand for infant and toddler care by the concentration of poverty, race and ethnicity in block groups across the District. Demand for infant and toddler care mirrors

trends in demand for all early learning (see Appendix II). The level of demand was greatest in areas with the highest rates of family poverty; 68% of block groups where the rate of family poverty was over 40% had high or very high demand for infant and toddler care, compared with only 21% of block groups where fewer than 10% of families were in poverty.

Exhibit 6: Maximum Potential Demand for Infant and Toddler Early Learning (Ages 0 to 3), Normalized by Acre, Washington, D.C.



Source: Reinvestment Fund

Calculating Estimates of Demand (For Ages 0 to 3)

Exhibit 7: Distribution of Maximum Potential Demand for Infant and Toddler Early Learning (Ages 0 to 3), by Family Poverty, Race and Ethnicity, Washington, D.C.

	Very Low Potential Demand	Low Potential Demand	Moderate Potential Demand	High Potential Demand	Very High Potential Demand	High + Very High Potential Demand	Total
<10% Family Poverty	14%	23%	42%	15%	6%	21%	100%
10%-20% Family Poverty	9%	30%	34%	20%	6%	26%	100%
20%-40% Family Poverty	1%	10%	45%	29%	15%	44%	100%
>40% Family Poverty	0%	3%	29%	39%	29%	68%	100%
<10% Hispanic	19%	23%	37%	11%	11%	22%	100%
10%-20% Hispanic	20%	8%	28%	34%	10%	44%	100%
20%-40% Hispanic	8%	24%	48%	12%	8%	20%	100%
>40% Hispanic	4%	21%	42%	23%	10%	33%	100%
<10% African-American	11%	20%	37%	21%	12%	33%	100%
10%-25% African-American	14%	21%	40%	16%	8%	24%	100%
25%-50% African-American	0%	19%	58%	23%	0%	23%	100%
>50% African American	7%	14%	50%	14%	14%	28%	100%
<10% White	4%	20%	38%	23%	14%	37%	100%
10%-40% White	3%	19%	53%	21%	4%	25%	100%
40%-80% White	19%	20%	30%	18%	13%	31%	100%
>80% White	15%	20%	41%	16%	8%	24%	100%

Source: Reinvestment Fund

How to read this table: 6% of block groups where 10% to 20% of families are in poverty had very high demand for early learning. Or 4% of block groups where Hispanic residents comprised 40% or more of all residents had very low demand for early learning.



Calculating Estimates of Supply (For Ages 0 to 3)

As stated earlier in this report, data is not available on informal early learning providers such as relatives, neighbors, friends or privately hired nannies or au pairs; therefore, data on the supply of infant and toddler early learning providers is limited to formal and regulated providers. Appendix II in this report provides estimates of the supply and demand for early learning programs serving children ages 0 to 5. These estimates attempt to capture the supply of early learning provided by formal but unlicensed providers by analyzing business listing records to identify early learning providers not identified in the district's license database. Unfortunately, these datasets do not include information about the age of children served and therefore are excluded from the estimates of infant and toddler supply provided here.

Furthermore, data on the quality of care is limited to providers that participate in formal rating systems either through national child care associations, such as NAEYC, or the District's quality rating system. Because participation in the District's quality rating system is tied to receiving public subsidy, many operators with ratings from the District are located in low-income communities, creating an appearance of higher supply in these neighborhoods.

The number of formal early learning "seats" for infants and toddlers is computed by aggregating the infant and

toddler capacity in each early learning program. For programs licensed by OSSE, capacity represents each program's licensed capacity to serve infants and toddlers.

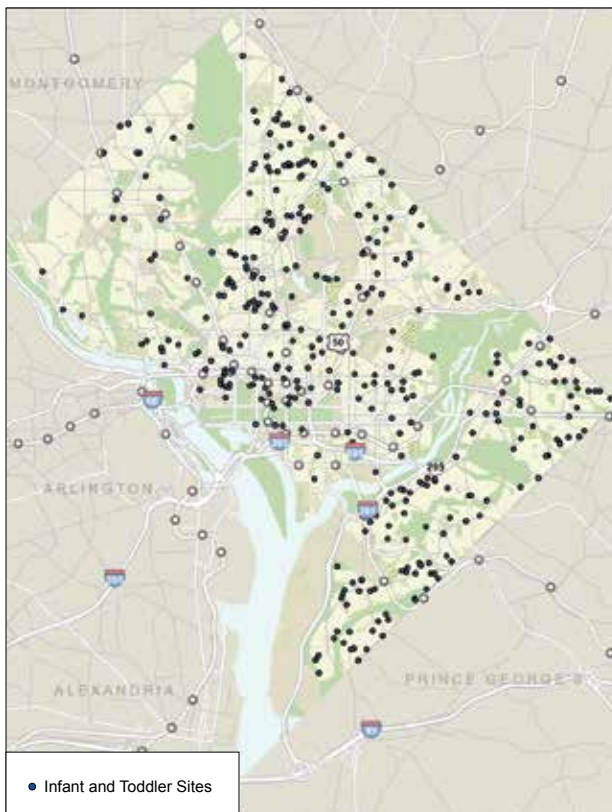
Across the District, there are 382 formal and regulated early learning programs that serve infants and toddlers (ages 0 to 3), resulting in an estimated supply of 8,214 infant and toddler seats. (See Exhibit 8.) These estimates represent the maximum potential supply of early learning seats, if every center were enrolled at full capacity. Again, importantly, this measure of supply does not include

“Given the high cost of early learning in D.C., an important way to understand access is by examining the level of subsidized early learning supply.”

informal care provided by relatives, neighbors, friends or privately hired nannies or au pairs.

Exhibit 9 shows the estimated number of infant and toddler seats within a half-mile of each census block group.¹¹ Darker areas have a high number of seats available for families with infants and toddlers. Lighter shaded areas have fewer seats.

Exhibit 8: Formal and Regulated Early Learning Programs Serving Infants and Toddlers (Ages 0 to 3) Districtwide, Washington, D.C.



Source: Reinvestment Fund

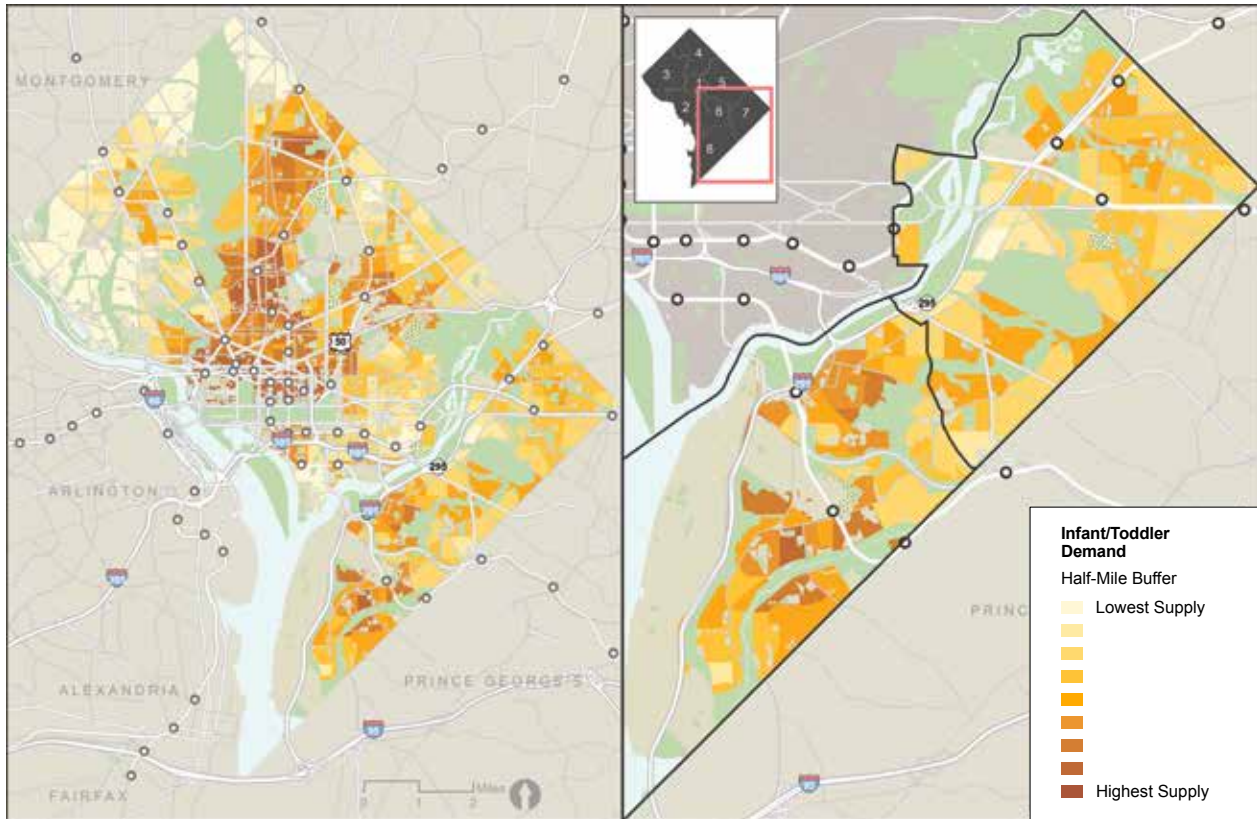
Providers Participating in Subsidized Early Childhood Education Programs

Given the high cost of early learning in D.C., an important way to understand access is by examining the level of subsidized early learning supply. Across the District, programs exist to help offset the cost of care for parents and families. Providers that participate in subsidy programs included OSSE-licensed sites that indicated they accepted public subsidy, school-based DC Public Schools and charter school programs, and Head Start programs.

Of the 8,214 seats for infants and toddlers in D.C., 4,882 seats (59%) were in programs that accepted some form of subsidy or operated tuition-free. If every one of these programs only served subsidized children, their collective capacity would barely be enough to meet the demand for early learning in Ward 8 (estimated at 5,387).

Many of the programs that accepted some form of subsidy also met the Stakeholder Group’s definition of high quality. As observed in Exhibit 10, among the 4,882 seats in early learning programs that accepted some form of subsidy, 4,045 were in high-quality programs (49% of all early learning seats).

Exhibit 9: Density of Infant and Toddler Early Learning (Ages 0 to 3), Washington, D.C.



Source: Reinvestment Fund

Exhibit 10: Supply and Quality of Formal and Regulated Program Slots (Subsidized and Unsubsidized) Serving Infants and Toddlers, Washington, D.C.

	Regular-Quality Program Slots	High-Quality Program Slots	All Program Slots
Programs With Subsidy	837 (10%)	4,045 (49%)	4,882 (59%)
Programs Without Subsidy	2,004 (24%)	1,328 (16%)	3,332 (41%)
All Programs	2,841 (35%)	5,373 (65%)	8,214 (100%)

Source: Reinvestment Fund



Comparing Estimates of Supply and Demand (For Ages 0 to 3)

The following section explores the relationship between the supply of formal and regulated early learning for infants and toddlers and demand for infant and toddler early learning. Although our estimates are limited by the availability of data on informal care provided by relatives, neighbors, friends or privately hired nannies or au pairs, they provide a useful framework for funders and policymakers interested in making investments to grow the supply of high-quality infant and toddler care. Understanding where large gaps exist between the measured supply of and demand for infant and toddler early learning can help provide a framework for prioritizing public and private investments designed to create seats in licensed high-quality early learning providers.

Absolute Versus Relative Shortages

When comparing estimates of supply and demand, there are two types of shortages to consider: *absolute shortages* and *relative shortages*.

The absolute shortage is the raw difference between supply and commuter-adjusted demand in each block group. For example, if block group A has a supply of 100 but a demand of 300, the *absolute shortage* would be 200.

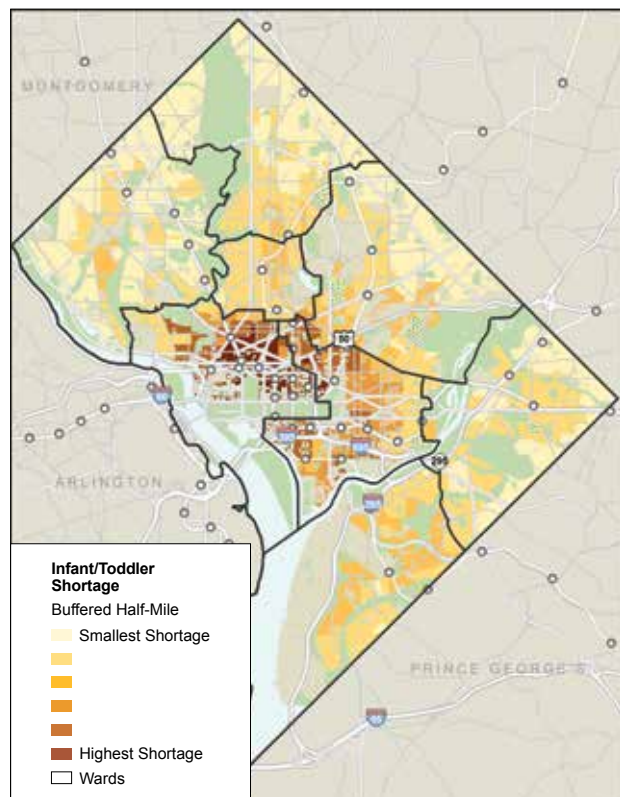
A relative shortage is the difference between the observed supply in a block group and a block group's expected supply given the level of demand in the block group. Expected supply is derived from a regression model that estimates a level of supply relative to the observed demand, based on the Districtwide relationship of supply to demand. This measure takes into consideration that not all parents look for early learning and that, generally, providers will adjust the level of supply they offer based on the market demand for their services. By measuring the expected level of supply that

providers offer at different levels of demand, we can determine whether the level of supply in a particular area is larger or smaller than what the local market typically provides. In areas where supply is less than the market average at the area's level of demand, relative shortages are high. In areas where supply is greater than the market average, relative shortages are low.

Relative shortages across the study area are sorted into five groups based on their distance from the average (i.e., expected shortage): Much-Higher-Than-Expected Supply, Higher-Than-Expected Supply, Expected Supply, Less-Than-Expected Supply, Much-Less-Than-Expected Supply. The Expected Supply represents the average level of mismatch between supply and demand based on the dynamics of the local market.

Relative shortages are helpful for comparing different areas of the city and identifying those areas with the largest gaps relative to the rest of the city. Identifying supply shortages, particularly relative shortages, provides key

**Exhibit 11: Baseline Scenario*:
A Comparison of Available Supply and
Demand Estimates by Census Block Group**



Source: Reinvestment Fund

*Note that the demand estimates include the maximum potential demand for early learning by examining the population of children living in and near D.C., and the supply estimates do not include informal providers such as relatives, neighbors, friends, nannies and au pairs. As such, the absolute shortages presented in this baseline scenario provide an upper-bound estimate, and over time, as more data becomes available, this scenario can be refined and updated.

insights for targeting programmatic or investment activity to address unmet demand in underserved areas. Similar scenarios for all early learning (ages 0 to 5) were calculated and are included in Appendix II.

Baseline Scenario Analysis: A Comparison of Maximum Parental Demand Versus Supply of Formal, Regulated Early Learning Providers Serving Infants and Toddlers

For illustration purposes, the following presentation provides a baseline comparison of the supply and demand estimates presented in the previous sections. Note that the demand estimates include the maximum potential demand for early learning by examining the population of children living in and near D.C., and the supply estimates do not include informal

**Exhibit 12: Baseline Scenario*:
Gap Between Formal Seats and Maximum Demand by Ward,
Washington, D.C.**

Ward	Supply of Formal, Regulated Seats	Maximum Potential Demand	Gap Between Formal Seats and Maximum Demand
Ward 1	839	2,583	1,744
Ward 2	1,705	9,961	8,256
Ward 3	460	2,838	2,378
Ward 4	1,248	3,450	2,202
Ward 5	1,062	3,645	2,583
Ward 6	719	5,062	4,343
Ward 7	894	3,644	2,750
Ward 8	1,287	5,387	4,100
Citywide	8,214	36,571	28,357

providers such as relatives, neighbors, friends or privately hired nannies or au pairs. As such, the absolute shortages presented in this baseline scenario are an upper-bound estimate of shortages, and over time, as more data becomes available, this scenario can be refined and updated.

In this baseline scenario, shown in Exhibits 11 and 12, it is estimated that across the District there are 8,214 seats of infant and toddler early learning and a maximum estimated demand for 36,571 seats, resulting in an absolute shortage of 28,357 infant and toddler seats. The absolute shortage of 28,357 seats represents the number of seats District leaders would need to create to supply every infant and toddler in the city with a slot in an early learning program. Were the District to exclude nonresident children who travel with their parents to seek care in the city, the absolute shortage would be substantially less – 14,636. Similarly, of these young children residing in the District, if one assumes that only those with employed mothers would use early learning and that they have the average rate of employment (71% of mothers with children under age 6 in D.C. are employed [ACS data, 2016]), the absolute shortage would be approximately 10,392.

Adjusting the Baseline Scenario to Account for Quality of Supply

In addition to calculating absolute shortages in infant and toddler early learning overall, Reinvestment Fund

Comparing Estimates of Supply and Demand (For Ages 0 to 3)

calculated the absolute shortage in high-quality early learning. Of the 382 formal, regulated early learning programs identified in the District, 166 met the study's definition of high quality. Of the 8,214 early learning seats for infants and toddlers in D.C., 5,373 (65%) were in these 166 programs and were classified as high quality.

Based on this modified estimate of supply, the baseline scenario could be adjusted to produce an estimated absolute shortage of 31,198 high-quality infant and toddler seats. Exhibit 13 shows the supply of formal, regulated, high-quality infant and toddler care in each ward along with maximum potential demand and an estimate of absolute shortage.

Relative Shortages Calculations

In addition to examining absolute shortages for this baseline scenario, Reinvestment Fund also examined relative shortages. The relative shortage estimate compares the gap between the supply and demand for early learning in each block group with the average shortage across the city to identify areas where shortages may be

larger or smaller than expected. This measure takes into consideration that not all parents look for early learning and that, generally, providers will adjust the level of supply they offer based on the market demand for their services. By measuring the expected level of supply that providers offer at different levels of demand, we can estimate whether the level of supply in a particular area is larger or smaller than what the local market typically provides. In areas where supply is less than the market average, relative shortages are higher. In areas where supply is greater than the market average, relative shortages are lower.

Exhibit 14 presents the relative shortage computations for the baseline scenario data by block group. Areas shaded in maroon had higher-than-expected shortages as well as higher-than-average concentrations of infants and toddlers. Areas shaded in yellow had smaller-than-expected shortages, meaning the supply of infant and toddler early learning generally matched the city average, and smaller-than-average concentrations of infants and toddlers. Because our analysis did not capture early learning offered

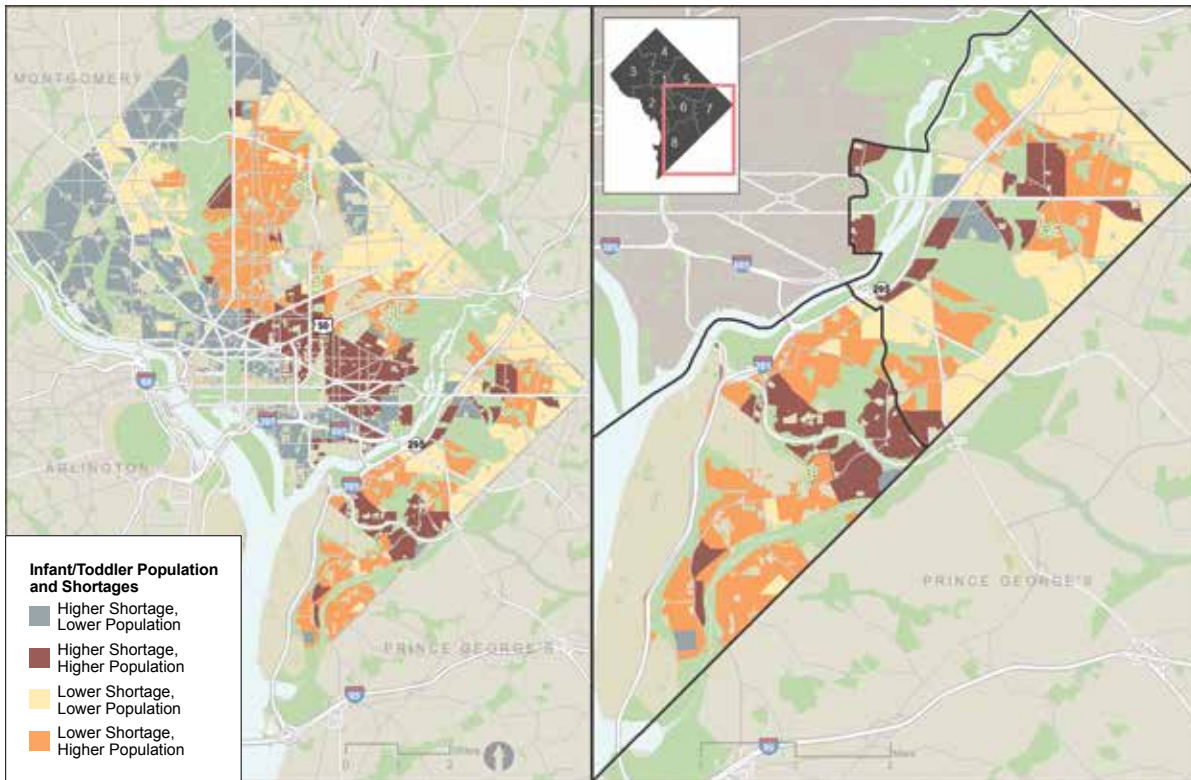
Exhibit 13: Quality Seat Scenario*: Baseline Scenario Adjusted for Quality of Providers, by Ward, Washington, D.C.

Ward	Supply of Formal, Regulated, High-Quality Seats	Maximum Potential Demand	Absolute Shortage Scenario
Ward 1	654	2,583	1,929
Ward 2	1,024	9,961	8,937
Ward 3	98	2,838	2,740
Ward 4	761	3,450	2,689
Ward 5	586	3,645	3,059
Ward 6	465	5,062	4,597
Ward 7	652	3,644	2,992
Ward 8	1,133	5,387	4,254
Citywide	5,373	36,571	31,198

Source: Reinvestment Fund

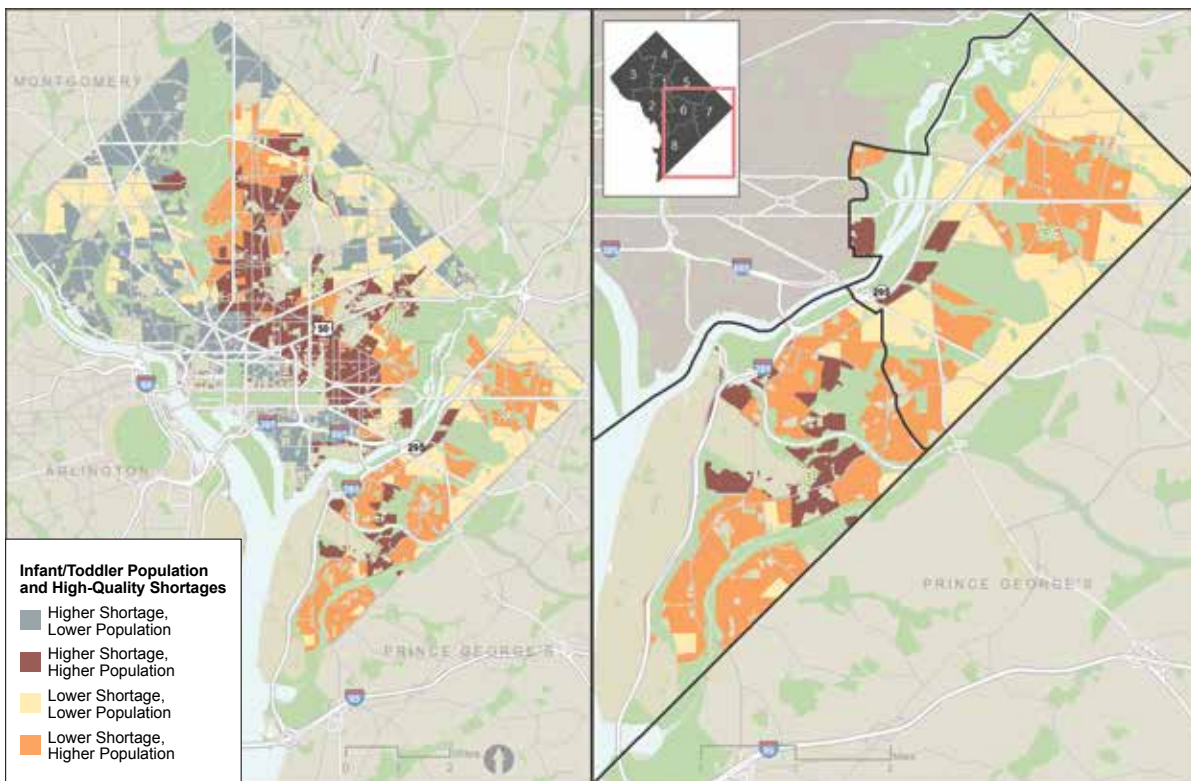
* Note that this data should be interpreted with caution because data on supply and quality is limited to formal providers and does not include nannies and au pairs, whose quality is unknown and are more likely to be used in higher-income neighborhoods (e.g., Wards 2 and 3).

Exhibit 14: Relative Shortage Estimates of All Infant and Toddler Seats (Ages 0 to 3) and Population of Infants and Toddlers (Ages 0 to 3), Washington, D.C.



Source: Reinvestment Fund

Exhibit 15: Relative Shortage Estimates of High-Quality Infant and Toddler Seats (Ages 0 to 3) and Population of Infants and Toddlers (Ages 0 to 3), Washington, D.C.



Source: Reinvestment Fund

Comparing Estimates of Supply and Demand (For Ages 0 to 3)

by in-home providers, such as nannies or au pairs, higher-income areas (e.g., Wards 2 and 3), where families are more likely to use these options, may be overrepresented among areas with larger-than-expected shortages.

Relative Shortages in High-Quality Infant and Toddler Early Learning for High-Population Areas

Exhibit 15 compares estimates of the relative shortage of high-quality infant and toddler early learning with the estimated population of infants and toddlers. The highest number of block groups with larger-than-expected shortages are concentrated in the northwest part of the District, where the fewest number of infant and toddler programs are located. Areas in Ward 6 and Ward 8 also show a substantial number of block groups with expected or larger-than-expected shortages of high-quality infant and toddler early learning.

Estimated Shortages by High-/Low-Income Areas

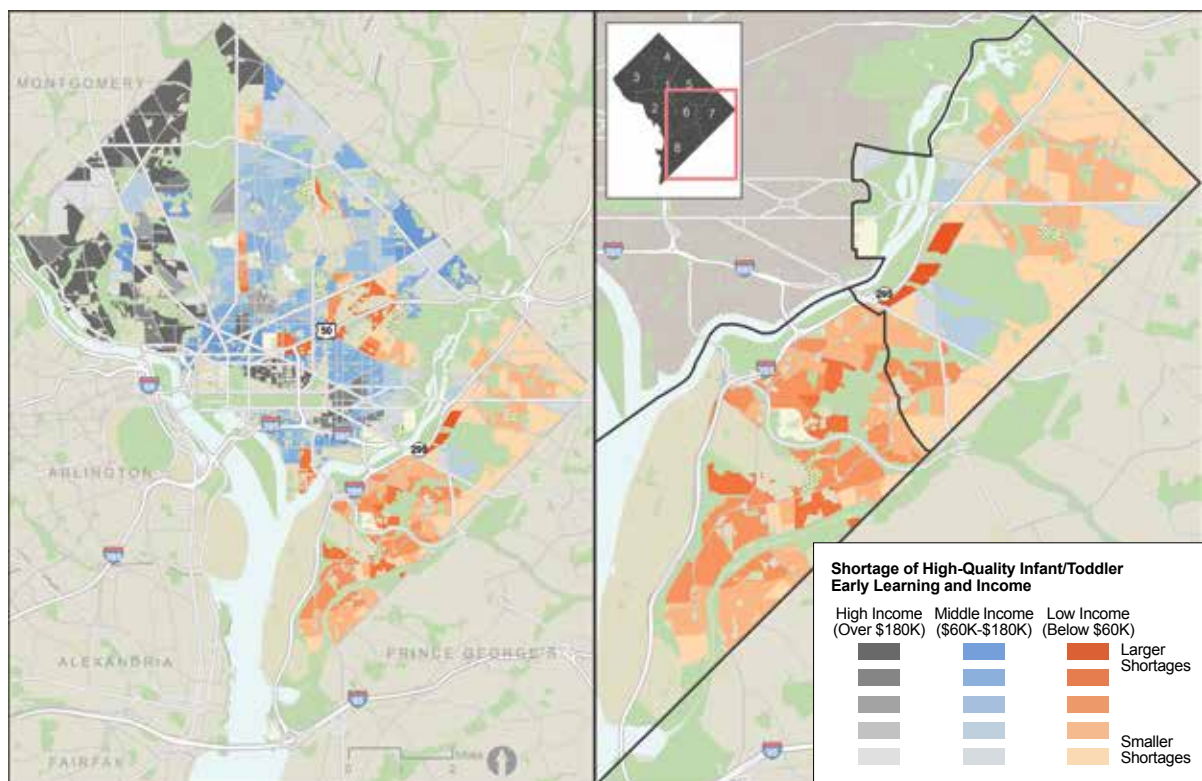
In the same way that estimated shortages can be examined by high-population areas, these shortages can

be examined by areas of high and low income. This data overlay acknowledges that shortages of early learning supply are not experienced the same by high- and low-income parents. For high-income parents, a lack of formal, regulated early learning providers in their neighborhood may present less of a challenge because they have the resources to access unregulated providers such as nannies and au pairs. For low-income parents, however, a shortage of providers in their neighborhood may present a greater challenge.

As Exhibit 16 illustrates, pockets of large-shortage block groups that are home to middle- and higher-income families are located throughout the District but concentrated in Wards 1, 2 and 3. This map also shows that with few exceptions, large-shortage block groups that are home to low-income families are located predominantly in the East End's Ward 7 and Ward 8.

For purposes of this map, high income is defined as more than \$180,000 annually, middle income is defined as \$60,000 to \$180,000, and low income is defined as less than \$60,000.¹²

Exhibit 16: Household Income by Shortage of High-Quality Early Learning (Ages 0 to 3), Washington, D.C.



Source: Reinvestment Fund



Conclusions and a Blueprint for Action

The analysis presented in this report represents the first comprehensive assessment of the supply of, and demand for, high-quality early learning throughout the District. The results highlight that the District faces a real shortage of infant and toddler care. The Reinvestment Fund calculation methodology estimates a maximum gap of 31,198 seats of high-quality early learning if every child ages 0 to 3 (plus those who commute in with their parents or guardians) was to be served; 17,477 seats would need to be added if only resident children are considered. Given the current supply of high-quality, formal, regulated providers of just 5,373 high-quality seats, even if a fraction of the resident children were expected to be served, the high-quality shortage is real.

Understanding where shortages exist is critical for designing programmatic interventions and making targeted investments. The results presented in this report provide a base for planners, policymakers, investors and practitioners from across the District to begin addressing these needs in an evidence-informed manner. In addition to the maps and tables in this report, stakeholders can access this analysis online through Early Childhood Map DC (www.ecmapdc.org), where they can learn more about early learning supply, demand and shortage in their communities.

These findings will inform the Early Learning Quality Fund (ELQF), a program for licensed early learning providers in Wards 7 and 8. The ELQF is designed to help providers improve their facilities to provide safe, high-quality learning environments for infants and toddlers. A partnership between the Bainum Family Foundation and Reinvestment

Fund, the ELQF aims to add 625 high-quality early learning seats in Wards 7 and 8 by 2020 as part of the Foundation's overall commitment to improve early childhood in the District. The ELQF will provide both technical assistance and financing (through a \$3.8 million forgivable loan fund established by the Foundation) to help providers make facility improvements. In addition, District government is using these findings to inform District Mayor Muriel Bowser's \$9 million grant and capital loan initiative, which aims to create more than 1,000 high-quality early learning seats.

While this analysis describes the geographic contours of supply and demand, it does not address other critical barriers to early learning, such as cost and access. As noted in the report, even if a high-quality early learning provider is located next door to a child's home or a parent's workplace, cost may still put that opportunity out of reach.

As interventions are developed, they must consider these additional critical factors.

Such interventions will require commitment and investment by a wide range of stakeholders. Mitigating the District's high-quality early learning shortage presents an opportunity for public policymakers to address an issue that affects a wide swath of the community – middle-income families, as well as low-income families. Thus, it is appropriate for government to continue to play a leadership role in partnership with the Bainum Family Foundation and other philanthropies committed to the success of the District and its families.

Business leaders must also join the conversation about effective interventions. The business community has obvious interests in mitigating the District's high-quality early learning shortfall. Ensuring confidence in the District's early learning system would contribute to stability among current employees by avoiding disruptions and distractions for working parents. And cultivating a high-quality early learning system would help the District attract high-performing job candidates who want opportunity for their children, as well as career opportunities for themselves.

“Moving beyond analysis to action must be a priority for the whole community.”

And, as is well-documented, the economic costs of failing young children – from lost economic productivity to higher health and social service expenditures – are substantial and reverberate throughout adulthood. Unlike other social problems with far-reaching consequences, the challenge presented by a shortage of high-quality early learning for infants and toddlers is one with a readily apparent solution: increase supply to meet demand.

Finally, parents have an obvious stake in finding solutions to this problem. What this analysis demonstrates is that the frustrations they experience in finding quality early learning for their own young children are not unique. Rather, their

frustrations are symptoms of a systemic problem, so they will not be alone if they raise the issue with policymakers, employers and other community leaders.

A Blueprint for Action

For both the Bainum Family Foundation and Reinvestment Fund, this is not an academic exercise aimed solely at better understanding the problem. The point of this analysis is to inform action.

This analysis provides a useful guide for all those committed to building a stronger and more equitable community. It doesn't only articulate where responses should be targeted; it also suggests the sorts of interventions that would contribute to progress. And it offers a reminder that although the high-quality infant and toddler early learning shortage affects nearly all District neighborhoods, it does not affect them all in the same way. Families with low incomes bear a disproportionate burden, and their needs should be prioritized.

As a result, District leaders must assess the need in each neighborhood and understand whether the need is improved access, higher quality, more affordability or (as is most likely) a mix. This analysis can serve as the beginning of such assessments, offering District leaders a starting point to tailor investments and interventions to each neighborhood's localized needs.

District leaders also must adopt a comprehensive strategy to improve the odds for infants and toddlers. Research and experience show that additional high-quality early learning will make a big difference. But often, its effects are largely in mitigating the harm children suffer when other support systems fail. Poverty, unmet health care needs, food insecurity, unstable or unsafe homes, and parents struggling in other ways to meet the family's needs – all of these factors serve as obstacles to a young child's healthy growth, development and learning.

These obstacles are intertwined, and they affect every aspect of a child's life. Likewise, an effective response that improves the odds for young children must be coordinated and must touch every aspect of a child's life.

Moving beyond analysis to action must be a priority for the whole community. District families have charged public officials with building a community where all can thrive, and that is especially true for young children. We hope this report serves as a decisive step in that direction.



Appendices

Appendix I – Stakeholder Group Participants

This analysis reflects the input of a diverse group of local early childhood education experts, practitioners and stakeholders (listed below), who convened throughout the course of the study to vet and provide feedback on the data sources and methods used in the analysis.

Organizations Represented in the D.C. Stakeholder Group

- Bainum Family Foundation
- Child Care Resources and Referral, Kids Comprehensive Services
- DC Action for Children
- DC Association for the Education of Young Children
- DC Early Learning Collaborative
- DC Family Child Care Association
- DC Fiscal Policy Institute
- DC Head Start Association
- DC Office of Planning
- DC Policy Center
- Department of Consumer and Regulatory Affairs, Office of the Zoning Administrator
- My School DC
- Office of DC Council Member Elissa Silverman
- Office of DC Council Member Robert White
- Office of the DC City Administrator
- Office of the DC Deputy Mayor for Education
- Office of the State Superintendent of Education, Division of Data, Assessment and Research
- Office of the State Superintendent of Education, Division of Early Learning
- Quality Facilitator Program Manager, Hurley and Associates
- Raise DC
- Washington Area Women's Foundation

Appendix II – A Broader Look at Early Learning Supply and Demand (For Ages 0 to 5)

This section provides an overview of supply and demand estimates for all early learning programs serving children ages 0 to 5 in the District of Columbia.

Calculating Estimates of Demand (For Ages 0 to 5)

To estimate the demand for all early learning for children ages 0 to 5, consider both those parents who seek early learning near their home and parents who seek early learning near their places of work – an important factor in a city like D.C., where a substantial number of workers commute to jobs in the District from the surrounding region. As such, these numbers include both residents and nonresident children whose parents live in the cities and towns surrounding the District.

Starting Point: Maximum Potential Demand Scenario

Estimates of maximum potential demand represent the total number of potential customers for early learning. This “maximum demand scenario” illustrates an assumption that there will need to be a seat for every child – much like there is a spot for virtually every age-appropriate child in first grade. It includes resident children as well as those who commute into the District from other states with their parent or guardian (adding to the total demand) as well as those who commute

D.C. Taken together, these estimates yield a maximum potential demand for 58,087 early learning seats in D.C. (See Exhibit 1A, Map 2.)¹³ Considering only residents yields a maximum potential demand for 36,293 early learning seats.

Demand for early learning is not evenly distributed across the District. Exhibit 2A maps the estimated level of maximum potential demand for early learning across every census block group in the District. Values are normalized by land area to account for the varying sizes of each block group.¹⁴ Demand

“The maximum potential demand for early learning was greatest in areas with the highest rates of family poverty.”

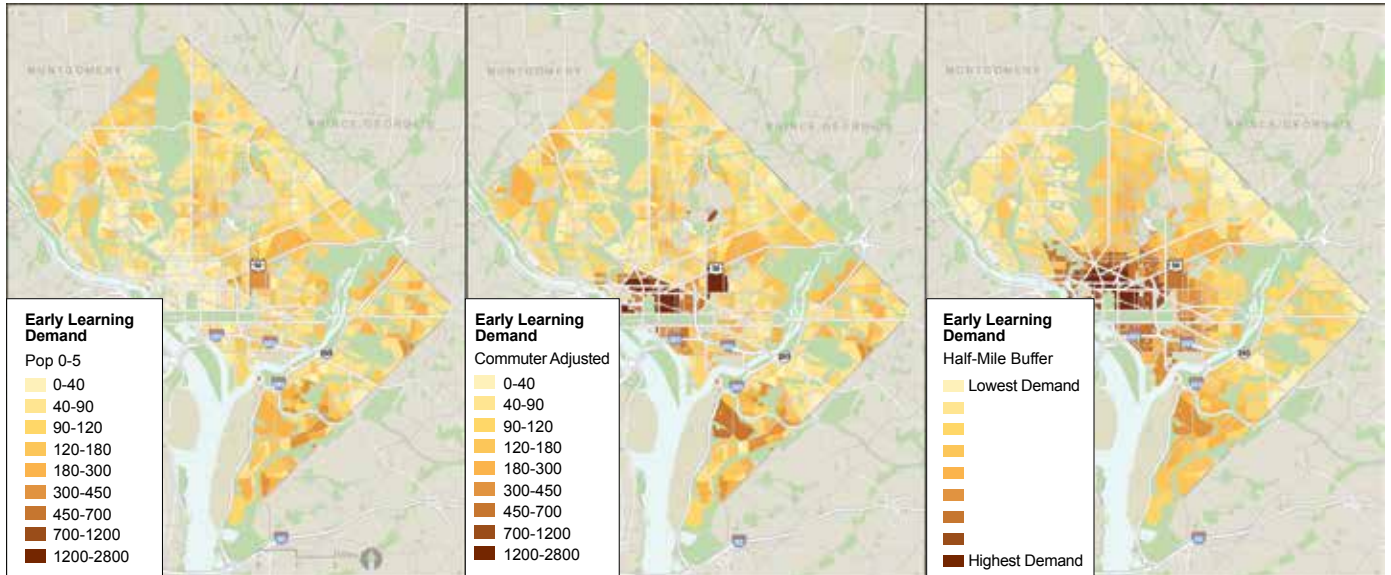
out (reducing the total demand). The process also moves children around within the District based on work and residence patterns of parents and guardians.

In 2017, there were an estimated 43,134 children ages 0 to 5 living in D.C. (See Exhibit 1A, Map 1.) Reviewing parental commuting patterns, we estimate that 6,841 children in D.C. traveled with adults to early learning programs located outside of D.C., near a parent’s place of work, and an estimated 21,794 children who reside outside the District traveled with parents to programs near work locations inside

for early learning is greatest in areas just north of downtown, east of the U.S. Capitol, and in Wards 7 and 8. The northwest section of D.C. (Wards 3 and 4) and sections of Ward 5 had the lowest level of demand.

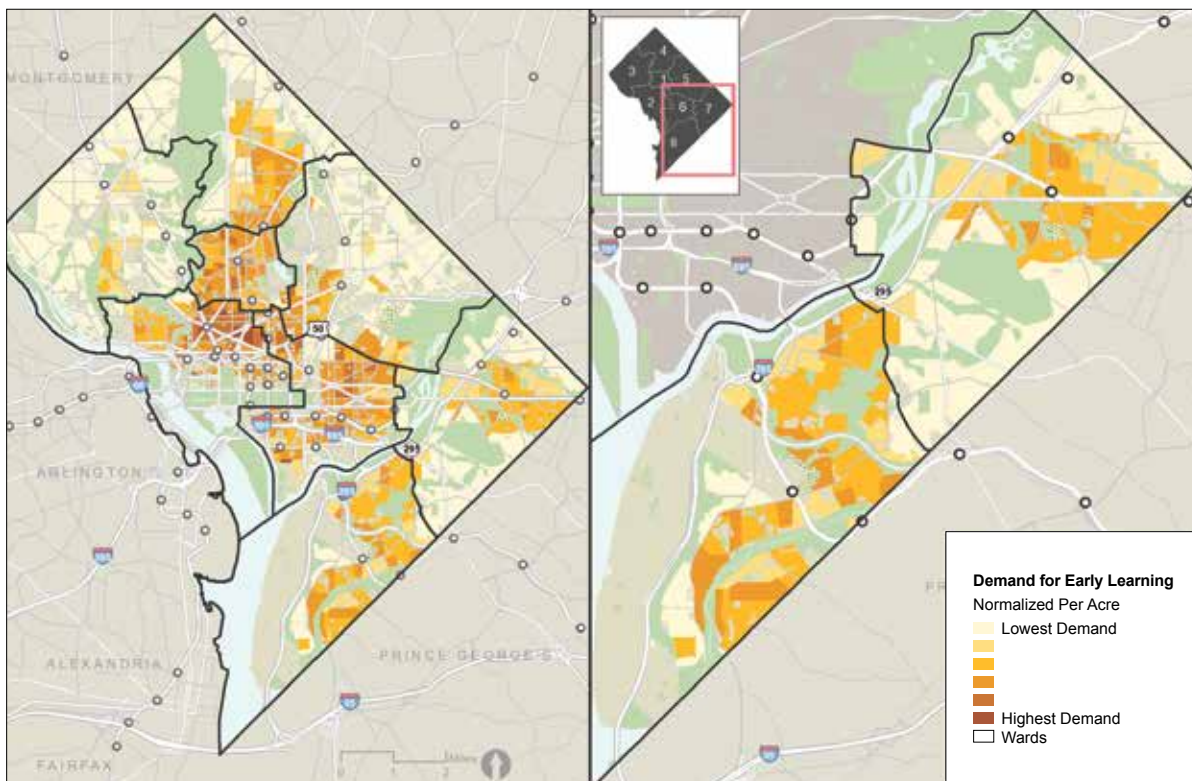
The maximum potential demand for early learning was greatest in areas with the highest rates of family poverty, driven by higher concentrations of children ages 0 to 5. Overall, 70% of block groups where the rate of family poverty was above 40% had high or very high demand for early learning (see Exhibit 3A).

Exhibit 1A: Components of Demand for Early Learning (Ages 0 to 5), Washington, D.C.



Source: Reinvestment Fund

Exhibit 2A: Maximum Potential Demand for Early Learning (Ages 0 to 5), Normalized per Acre, Washington, D.C.



Source: Reinvestment Fund

Exhibit 3A: Distribution of Maximum Potential Demand for Early Learning (Ages 0 to 5), by Family Poverty, Race and Ethnicity, Washington, D.C.

	Very Low Potential Demand	Low Potential Demand	Moderate Potential Demand	High Potential Demand	Very High Potential Demand	High + Very High Potential Demand	Total
<10% Family Poverty	15%	22%	42%	14%	6%	20%	100%
10%-20% Family Poverty	5%	33%	36%	22%	5%	27%	100%
20%-40% Family Poverty	0%	11%	43%	32%	14%	46%	100%
>40% Family Poverty	0%	3%	26%	35%	35%	70%	100%
<10% Hispanic	10%	20%	37%	20%	12%	32%	100%
10%-20% Hispanic	14%	22%	38%	19%	7%	26%	100%
20%-40% Hispanic	2%	17%	58%	23%	0%	23%	100%
>40% Hispanic	7%	14%	50%	14%	14%	28%	100%
<10% African-American	20%	20%	36%	14%	11%	25%	100%
10%-25% African-American	21%	8%	31%	28%	11%	39%	100%
25%-50% African-American	8%	24%	45%	16%	7%	23%	100%
>50% African American	3%	22%	43%	22%	10%	32%	100%
<10% White	3%	19%	40%	23%	15%	38%	100%
10%-40% White	2%	24%	51%	20%	3%	23%	100%
40%-80% White	21%	20%	30%	17%	13%	30%	100%
>80% White	15%	18%	41%	19%	8%	27%	100%

Source: Reinvestment Fund

How to read this table: 5% of block groups where 10% to 20% of families are in poverty had very low demand for early learning. Or 35% of block groups where poverty exceeds 40% had very high demand for early learning.

Comparing Demand and Affordability

Many of the areas with the lowest ability to afford early learning also have the highest potential demand for early learning. Of the 43,134 children under the age of 5 living in D.C., 60% live in a census block group where the average cost of center-based care exceeds 30% of the median household income.

Exhibit 4A: Population of Children (Ages 0 to 5), by Median Household Income and Cost of Early Learning, Washington, D.C.

	Number of Children Ages 0 to 5	Percentage of Children Ages 0 to 5
Cost of Care Is Less Than 10% of Median Income	806	2%
Cost of Care Is 10% to 30% of Median Income	15,535	36%
Cost of Care Is 30% to 50% of Median Income	9,134	21%
Cost of Care Is Over 50% of Median Income	16,618	39%
Median Income Unknown	1,041	2%
Total	43,134	100%

Source: American Community Survey, 2012-2016

“Many of the areas with the lowest ability to afford early learning also have the highest potential demand for early learning.”



Calculating Estimates of Supply (For Ages 0 to 5)

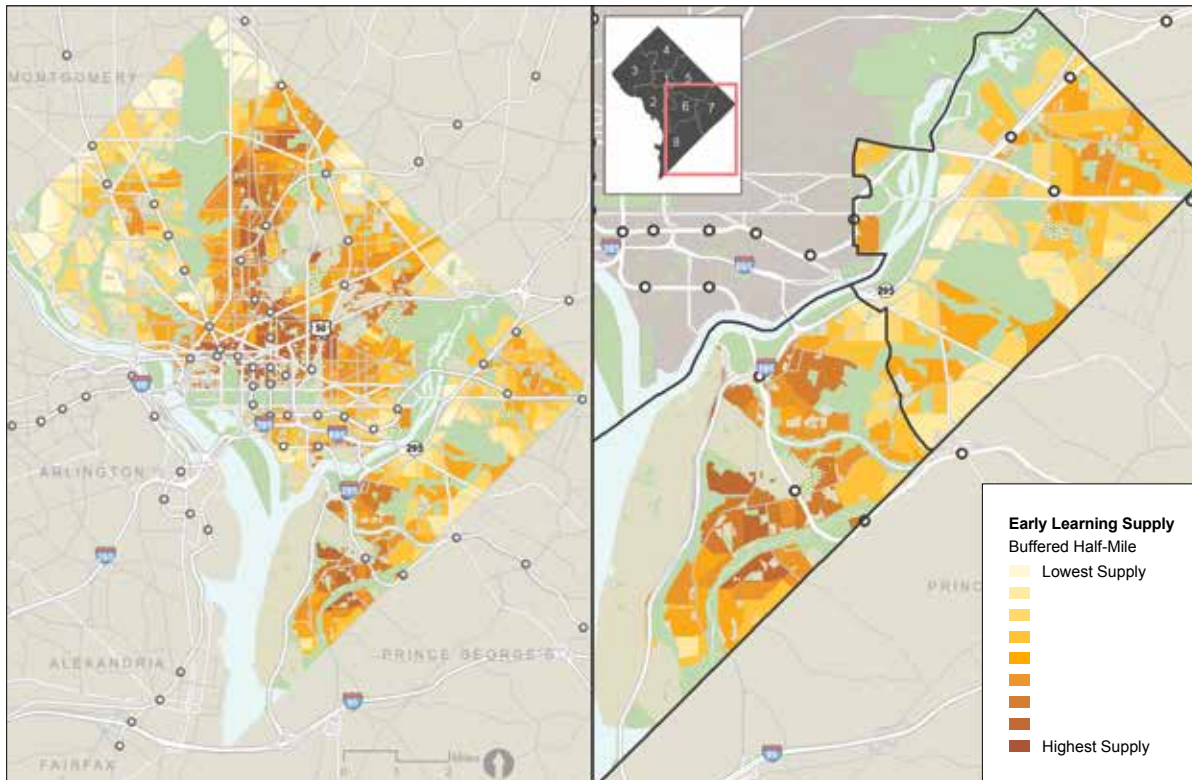
To estimate the supply of early learning, Reinvestment Fund worked with a local Stakeholder Group to identify data on early learning programs from multiple data sources. Working with the Stakeholder Group, we identified nine datasets that describe programs that offer a combination of supervision and educational programming for children under the age of 5. Our estimates combine data from the District's QRIS database, national business listing services, alternative accreditation programs and local private school networks.¹⁵

As stated earlier in this report, data is not available on informal early learning providers such as relatives, neighbors, friends or privately hired nannies or au pairs. However, unlike with our estimates regarding infant and toddler supply, we were able to estimate the number of early learning programs that did not hold OSSE licenses. Many of these programs had exemptions, for example

programs located in federal facilities, and pre-K classrooms located in public and private schools. Other small programs identified through business listing services were largely unregulated.¹⁶

Across D.C., Reinvestment Fund estimated the total supply of early learning to be 37,753 seats. Of those, roughly 18,370 seats (49%) were licensed by OSSE, while

Exhibit 5A: Density of Early Learning Supply (Ages 0 to 5), Washington, D.C.



Source: Reinvestment Fund

“These estimates represent the maximum potential supply of early learning seats, if every center were enrolled at full capacity.”

the remaining 51% (19,383 seats) were unlicensed. The nonlicensed count includes license-exempt programs that are not required to be licensed by OSSE, such as programs operated by district schools, private schools or religious organizations. These estimates represent the maximum potential supply of early learning seats, if every center were enrolled at full capacity. For programs where capacity

information was unavailable, capacity was estimated from enrollment or employee counts, where available.

Exhibit 5A shows the density of early learning supply across the District.¹⁷ Overall, the greatest supply of early learning is found in areas near downtown and along the corridor east of I-295. The western half of the District had the lowest level of supply.

Comparing Estimates of Supply and Demand (For Ages 0 to 5)

The following section explores the relationship between the supply of formal early learning for children 0 to 5 and demand for early learning. Although our estimates are limited by the availability of data on informal care provided by relatives, neighbors, friends or privately hired nannies or au pairs, they provide a useful framework for funders and policymakers interested in making investments to grow the supply of high-quality care. Understanding where large gaps between the measured supply of and demand for early learning exist can help provide a framework for prioritizing public and private investments designed to create seats in licensed high-quality early learning providers.

Baseline Scenario Analysis: A Comparison of Maximum Parental Demand Versus Supply of Formal Early Learning Providers Serving Children Ages 0 to 5

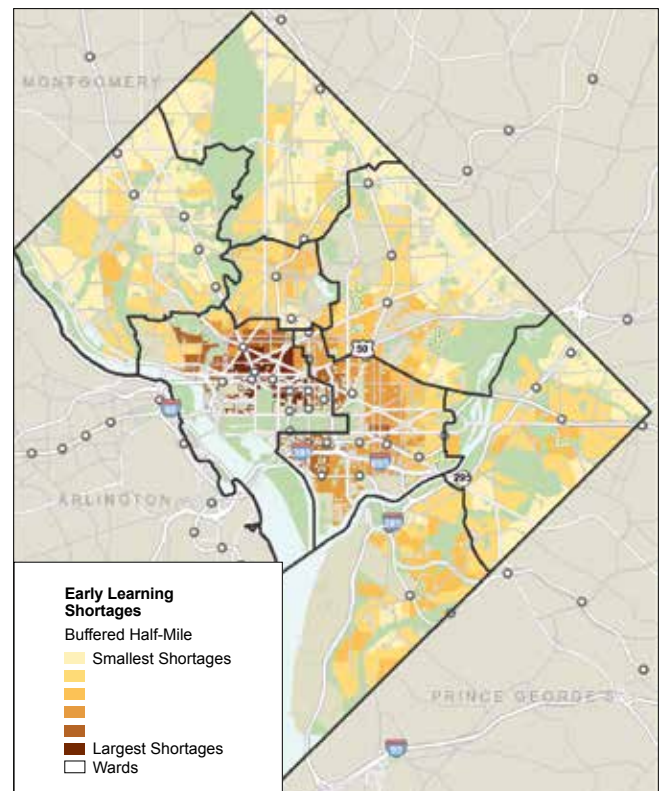
In this baseline scenario, shown in Exhibits 6A and 7A, it is estimated that across the District there are 37,753 early learning seats and an estimated maximum potential demand for 58,087 early learning seats, resulting in an absolute shortage of 20,334 seats. Absolute shortage represents the number of seats District leaders would need to create in order to serve every child in the city, including nonresidents who travel with their parents from outside of D.C.

Adjusting the Baseline Scenario to Account for Quality of Supply

In addition to calculating total shortages, Reinvestment Fund also calculated the shortage in high-quality early learning supply. Similar to the infant and toddler analysis, Reinvestment Fund used multiple indicators to identify high-quality early learning programs. For early learning programs serving children ages 0 to 5, we also included indicators related to public schools to account for the number of programs in the DC Public Schools and charter schools. Programs were identified as high quality if they met one of four conditions:

- Highly Rated QRIS Programs – Programs with Gold or Silver ratings under the District’s QRIS system
- Accredited Programs – Programs holding accreditations from the National Association for the Education of Young

Exhibit 6A: Baseline Scenario*: A Comparison of Available Supply and Demand Estimates by Census Block Group



Source: Reinvestment Fund

Exhibit 7A: Baseline Scenario*: Gap Between Formal Seats and Maximum Demand by Ward, Washington, D.C.

Ward	Supply of Formal Seats	Maximum Potential Demand	Gap Between Formal Seats and Maximum Demand
Ward 1	2,465	3,962	1,497
Ward 2	5,427	15,556	10,129
Ward 3	3,150	4,659	1,508
Ward 4	5,779	5,661	-118
Ward 5	5,191	5,855	663
Ward 6	4,814	7,674	2,860
Ward 7	4,268	5,989	1,721
Ward 8	6,658	8,731	2,073
Citywide	37,753	58,087	20,334

*Note that the demand estimates include the maximum potential demand for early learning by examining the population of children living in and near D.C., and the supply estimates do not include informal providers such as relatives, neighbors, friends, nannies and au pairs. As such, the absolute shortages presented in this baseline scenario provide an upper-bound estimate, and over time, as more data becomes available, this scenario can be refined and updated.

Children (NAEYC) or the National Association of Family Child Care (NAFCC)

- Head Start and Early Head Start – Programs that participate in Head Start or Early Head Start
- Highly Rated Charter Schools – Pre-K3 and Pre-K4 classrooms in charter schools with the highest quality rating from the D.C. Public Charter School Board (Tier-1)

As stated earlier in this report, one concern raised by the Stakeholder Group was that relying only on the District’s QRIS as an indicator of quality could bias the results. Because ratings on the District’s QRIS are at least partially tied to subsidies, looking only at programs rated highly on the District’s QRIS system could make it appear as if a disproportionate number of high-quality programs were located in low-income communities. The same concern exists for Head Start and Early Head Start programs, which only serve families in poverty.

Across the District there were 19,470 seats in early learning programs identified as high quality, resulting in an absolute shortage of 38,617 high-quality seats. Exhibit 8A shows the total high-quality supply, demand and shortage in each ward. The largest absolute shortages were in Ward 2, as well as Wards 6 and 8.

Relative Shortage Calculation, Ages 0 to 5

In addition to examining absolute shortages for this baseline scenario, Reinvestment Fund also examined relative shortages. The relative shortage estimate compares the gap between the supply and demand for early learning in each block group with the average shortage across the city to identify areas where shortages may be larger or smaller than expected.

Exhibit 9A presents the relative shortage computations for the baseline scenario data by block group. Areas shaded in maroon had higher-than-expected shortages as well as

Exhibit 8A: Quality Seat Scenario*: Baseline Scenario Adjusted for Quality of Providers, by Ward, Washington, D.C.

Ward	Supply of Formal, High-Quality Supply	Maximum Potential Demand	Absolute Shortage Scenario
Ward 1	1,393	3,962	2,569
Ward 2	2,794	15,556	12,762
Ward 3	664	4,659	3,995
Ward 4	2,973	5,661	2,688
Ward 5	2,340	5,855	3,515
Ward 6	2,272	7,674	5,402
Ward 7	2,711	5,989	3,278
Ward 8	4,323	8,731	4,408
Citywide	19,470	58,087	38,617

* Note that this data should be interpreted with caution because data on supply and quality is limited to formal providers and does not include nannies and au pairs, whose quality is unknown and who are more likely to be used in higher-income neighborhoods (e.g., Wards 2 and 3).

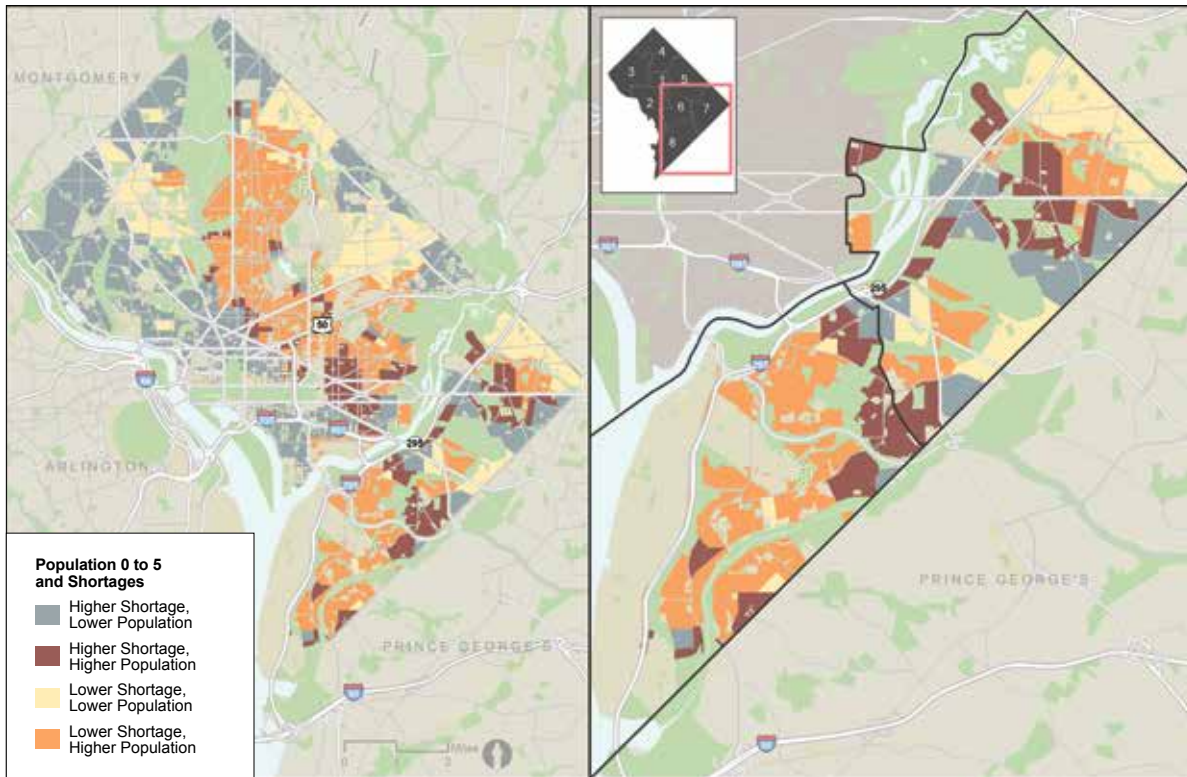
“Across the District there were 19,470 seats in early learning programs identified as high quality, resulting in an absolute shortage of 38,617 high-quality seats.”

higher-than-average concentrations of children 0 to 5. Areas shaded in yellow had smaller-than-expected shortages, meaning the supply of early learning generally matched the city average, and smaller-than-average concentrations of children ages 0 to 5. Because our analysis did not capture informal early learning offered by in-home providers, such as nannies and au pairs, higher-income areas (e.g., Wards 2 and 3), where families are more likely to use these options may be over-represented among areas with larger-than-expected shortages.

Relative Shortages in High-Quality Early Learning

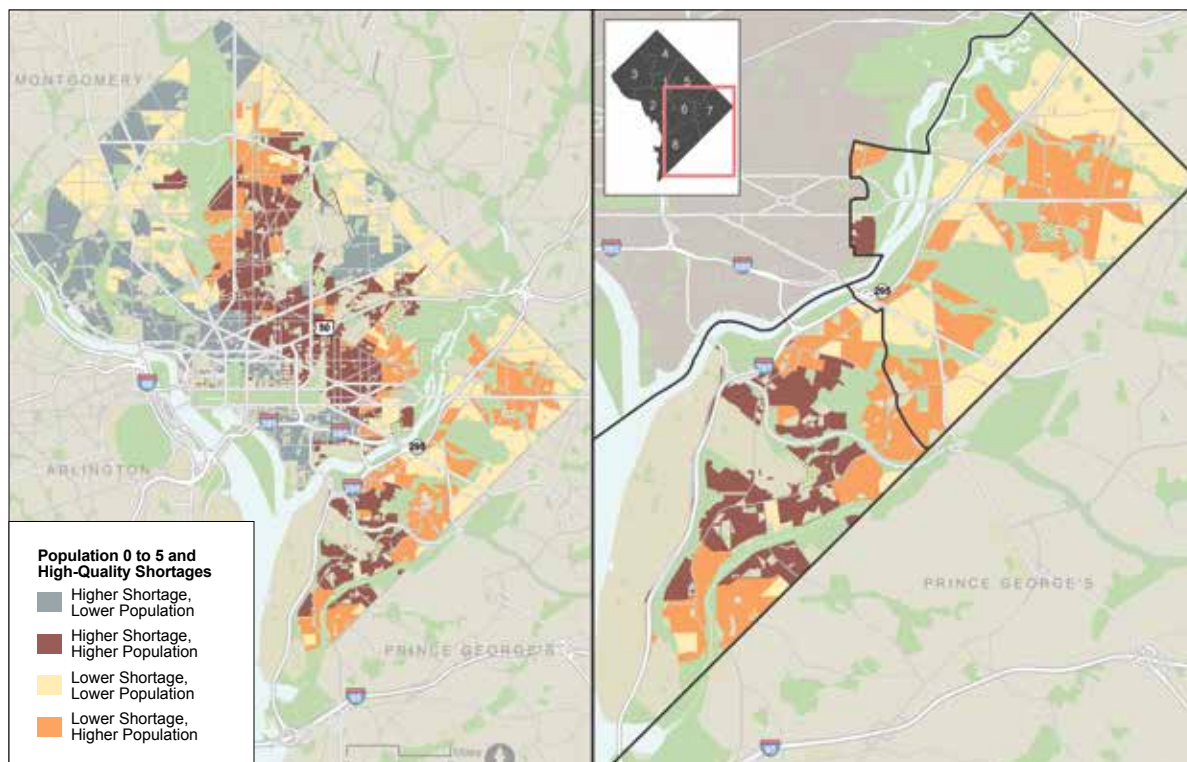
Exhibit 10A compares estimates of the relative shortage of high-quality early learning with the estimated population of children 0 to 5. The highest number of block groups with larger-than-expected shortages are concentrated in the northwest part of the District, where the fewest number of programs are located. Areas in Ward 6 and Ward 8 also show a substantial number of block groups with expected or larger-than-expected shortages of high-quality early learning.

Exhibit 9A: Relative Shortage Estimates of All Early Learning Seats (Ages 0 to 5) and Population of Children (Ages 0 to 5), Washington, D.C.



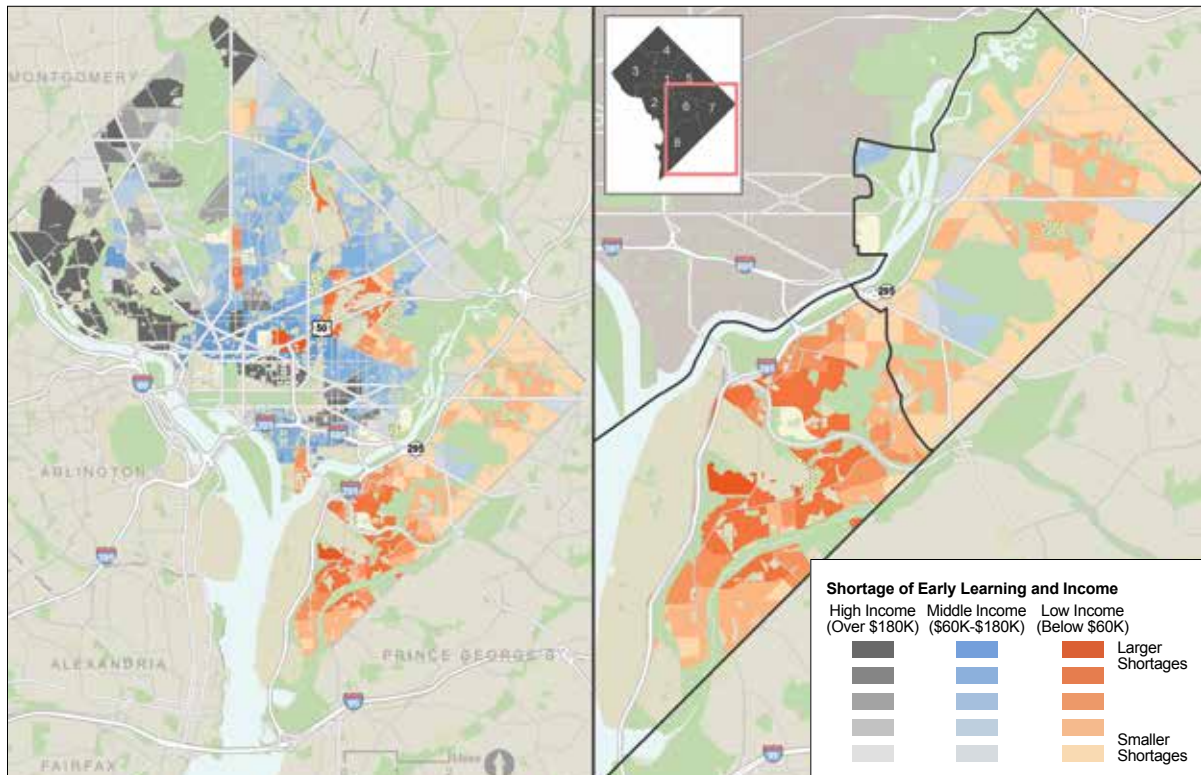
Source: Reinvestment Fund

Exhibit 10A: Relative Shortage Estimates of High-Quality Seats (Ages 0 to 5) and Population of Children (Ages 0 to 5), Washington, D.C.



Source: Reinvestment Fund

Exhibit 11A: Household Income by Shortage of High-Quality Early Learning (Ages 0 to 5), Washington, D.C.



Source: Reinvestment Fund

“Shortages of early learning supply are not experienced the same by high- and low-income parents.”

Estimated Shortages by High-/Low-Income Areas

In the same way that estimated shortages can be examined by high-population areas, these shortages can be examined by areas of high and low income. This data overlay acknowledges that shortages of early learning supply are not experienced the same by high- and

low-income parents. For high-income parents, a lack of formal early learning providers in their neighborhood may present less of a challenge because they have the resources to access unregulated and informal providers such as nannies and au pairs. For low-income parents, however, a shortage of providers in their neighborhood may present a greater challenge.

As Exhibit 11A illustrates, pockets of large-shortage block groups that are home to middle- and higher-income families are located throughout the District but concentrated in Wards 1, 2 and 3. This map also shows that with few exceptions, large-shortage block groups that are home to low-income families are located predominantly in the East End’s Ward 7 and Ward 8.

For purposes of this map, high income is defined as more than \$180,000 annually, middle income is defined as \$60,000 to \$180,000, and low income is defined as less than \$60,000.

Appendix III: Methodology

This appendix details the methodology used for the early learning analysis. The block group-level analysis comprised three primary steps: 1) measuring supply, 2) measuring demand and 3) measuring gaps between supply and demand. A Stakeholder Group of local early learning experts met three times in person and provided guidance and feedback throughout the process; several calls on specific issues between group meetings were convened.

Measuring Supply

Broadly speaking, an early learning program represents any business establishment or individual (e.g., center-based, home-based) that offers some combination of supervision and educational program or both for a group of children under age 5.

In the District, early learning programs fell into two major groups: licensed and unlicensed. The licensed programs included early learning programs licensed by OSSE. Unlicensed early learning programs are business establishments that provide early learning services but did not hold an OSSE license. Many of these programs had exemptions (for example, programs located in federal facilities or pre-K classrooms located in public and private schools). Other small programs identified through business listing services were largely unregulated.¹⁸

Data Sources and Cleaning

Estimating supply requires the identification of all known early learning programs in the District. There is no single source of all active early learning programs; therefore, developing as complete a list as possible required combining multiple datasets. Exhibit 12A identifies the sources and datasets that informed the supply estimate in D.C.

The primary data cleaning activities involved the proper identification of unique, full-time early learning facilities. First, all observations that did not align with the study's definition of early learning were removed. Second, facility addresses from each dataset were geocoded, and locations that were in multiple datasets were merged into one observation.¹⁹ In cases where programs from different data sources shared similar names or locations, manual checks (i.e., internet

searches and phone calls) were performed to resolve potential duplications.

Estimating Supply

For programs where OSSE license data was available, supply represents the licensed infant and pre-school capacity. For other early learning programs, capacity was estimated using the following methods:

1. For school-based programs, the greater of pre-K3 and pre-K4 enrollment figures published by the District and public charter school or lottery seats offered in pre-K3 and pre-K4 programs (where available)
2. Enrollment in Head Start and Early Head Start programs published by Head Start
3. For unregulated programs identified by NETS or InfoUSA, model-based estimates using employment information²⁰

High-Quality Supply

The next step in estimating supply was to identify those facilities that were considered high quality. A comprehensive conversation among the Stakeholder Group underscored the challenge of defining high quality. For the purposes of this analysis, the group reached a consensus to use the first three indicators below to identify high-quality early learning programs serving infants and toddlers (ages 0 to 3) and one additional indicator for programs serving children ages 3 and 4:

- Highly rated QRIS programs – Programs with Gold or Silver ratings under the District's QRIS system (called Going for the Gold when the analysis was conducted but updated now as Capital Quality)

Exhibit 12A: Supply Sources for the Early Childhood Education Analysis, Washington, D.C.

Source	Description
Archdiocese of Washington	List of all K-12 schools in Washington, D.C., operated by the Archdiocese of Washington that provided pre-K3 or pre-K4 programs
DC Public Charter School Board	List of all public charter schools in Washington, D.C., that provided pre-K3 or pre-K4 programs
DC Public Schools	List of all traditional public schools in Washington, D.C., that provided pre-K3 or pre-K4 programs
Head Start	List of all Head Start and Early Head Start sites operating in Washington, D.C.
InfoUSA	Business listing database used primarily for marketing purposes
National Association for the Education of Young Children (NAEYC)	National accreditation system for early learning programs
National Association of Family Child Centers (NAFCC)	National accreditation system for family child care centers
National Establishment Time-series (NETS)	Time-series database of business establishment information based on Dun & Bradstreet data
Office of State Superintendent of Education (OSSE)	State agency responsible for licensing early learning programs

- Accredited programs – Programs holding accreditations from the National Association for the Education of Young Children (NAEYC) or the National Association of Family Child Care (NAFCC)
- Head Start and Early Head Start – Programs that participate in Head Start or Early Head Start
- Highly rated charter schools – Pre-K3 and Pre-K4 classrooms in charter schools with the highest-quality rating (Tier 1) from the D.C. Public Charter School Board

Measuring Demand

Similar to estimating early learning supply, there is no direct measure of demand for out-of-home early learning services. A range of factors can affect the demand in a region beyond a simple count of the ages 0 to 5 population:

- **Many parents do not use external programs for their early learning needs.** A U.S. Census Bureau report using the Survey of Income and Program Participation (SIPP) showed that 42% of households with children under 5 years old with a working mother use early learning within their own home and 58% seek care outside of their home.²¹

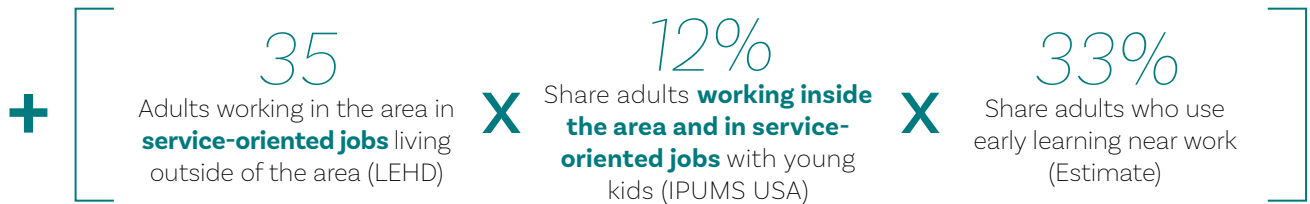
- **Multiple factors inform parents' selection of early learning programs.** Many parents select early learning programs close to home, but a sizable number of children travel with parents to attend facilities near a parent's place of work. A report on the early learning arrangements of working parents in Cook County, Illinois, found that 31% of parents with children in care have arrangements located on their way to work and 25% have arrangements that take them farther away from work. In Washington,

Exhibit 13A: Simplified Illustration of Commuter-Adjusted Demand

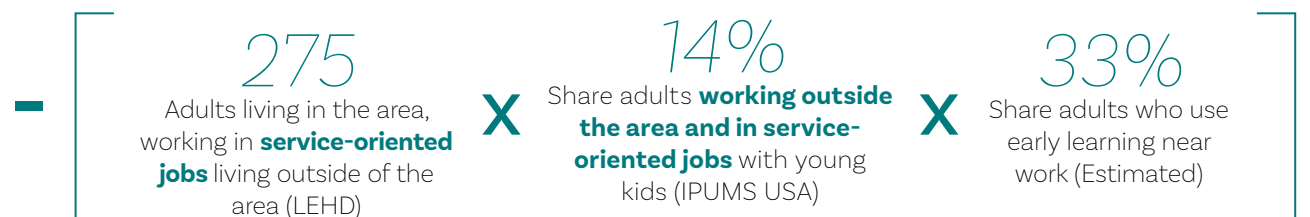
800

Population of kids ages 0 to 5 (Nielsen)

Additional Demand From Parents Working in Area But Living Elsewhere



Reduced Demand From Parents Living in Area But Working Elsewhere



789

Commuter-adjusted Demand

“The costs associated with providing early learning are high for programs, and vacancy can represent a substantial financial burden; thus, programs tend not to over-produce supply.”

D.C., 37% of families enroll children in District or charter school pre-K programs outside of their home ward.²²

Two demand measures were estimated for the analysis: baseline demand and commuter-adjusted demand. Baseline demand represents the number of children ages 0 to 5 in each census block group. Within each block group, adjustments were made to the baseline demand to account for commuting patterns and workforce characteristics; these adjustments yield a commuter-adjusted demand. This commuter-adjusted demand represents the maximum or potential number of children in an area that could use early learning programs.

Employment and mobility information are aggregated for each census block group in D.C. to estimate the number of adults who travel into a census block group for work (thereby increasing demand in the target block group) and the number of adults who travel outside of the census block group for work (thereby decreasing demand in the target block group).²³

Exhibit 13A presents a simplified example of calculating commuter-adjusted demand. The demand estimation for a single census block group is calculated by starting with the number of children under 5 years old living in the census block group, adding in the estimated number of children who live elsewhere but travel with their parents into the census block group, and then subtracting the estimated number of children who live in the census block group but travel with their parents to another area.

Identifying Shortages of Early Learning

After estimating the supply of and demand for early learning, the final step in the analysis identifies areas where the gaps between supply and demand are most severe. Shortages were measured in two ways across each supply measure (i.e., total and high-quality): absolute shortage and relative shortage.

The *absolute shortage* is the raw difference between supply and commuter-adjusted demand in each block group. For example, if block group A has a supply of 100 but a demand of 300, the absolute shortage would be 200.

The *relative shortage* is an adjusted figure that identifies block groups where observed gaps between supply and demand a) are greater than expected, b) are less than expected or c) meet expectations. In reality, the supply of early learning will almost always be less than the demand for two reasons. First, many parents simply do not use out-of-home care. Second, the costs associated with providing early learning are high for programs, and vacancy can represent a substantial financial burden; thus, programs tend not to over-produce supply.

Relative shortages across the study area are sorted into five groups based on their distance from the average (i.e., expected shortage): Much-Higher-Than-Expected Supply, Higher-Than-Expected Supply, Expected Supply, Less-Than-Expected Supply, Much-Less-Than-Expected Supply. The Expected Supply represents the average level of mismatch between supply and demand based on the dynamics of the local market.



End Notes

- 1 *Infants and Toddlers in the District of Columbia: A Statistical Look at Needs and Disparities*, Bainum Family Foundation, <https://bainumfdn.org/a-tale-of-two-cities-bainum-report-details-status-of-the-districts-youngest-residents/>
- 2 *Realizing the promise of high-quality early childhood education*, Andres S. Bustamante, Kathy Hirsh-Pasek, Deborah Lowe Vandell, and Roberta Michnick Golinkoff, Brookings Institution, <https://www.brookings.edu/blog/education-plus-development/2017/03/27/realizing-the-promise-of-high-quality-early-childhood-education/>
- 3 *Invest in early childhood development: Reduce deficits, strengthen the economy*, James J. Heckman, PhD, The University of Chicago, <https://heckmanequation.org/resource/invest-in-early-childhood-development-reduce-deficits-strengthen-the-economy/>
- 4 Childcare Aware of America. "District of Columbia: Cost of Childcare" Nov. 2017. Available: <https://usa.childcareaware.org/wp-content/uploads/2017/11/DistrictofColumbia2017.pdf>
- 5 *Ward Snapshots: Tracking Child Well-Being in Your Ward*, DC Action for Children, <http://www.dcactionforchildren.org/our-issues/dc-kids-count/2017-ward-snapshots>
- 6 See Appendix I for a complete list of organizations represented in the Stakeholder Group.
- 7 See: Forry, N. D., Tout, K., Rothenberg, L., Sandstrom, H., Vesely, C. (2013). *Child Care Decision-Making Literature Review*. OPRE Brief 2013-45. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.
- 8 See Appendix III for a more detailed explanation of sources and methods.
- 9 Illinois Action for Children, *Getting There: Cook County Parents' Commute to Child Care and Work*, June 2012; Deputy Mayor of Education, "Public Education Supply and Demand for the District of Columbia Elementary School Fact Sheet, SY2016-17" Nov 2017; Anecdotally, stakeholders believed that the rate at which parents commute into DC was much higher than national averages, although this would be offset by the lower rate at which parents of very young children utilize childcare near work compared with near home.
- 10 Calculations exclude parkland and water when measuring area.
- 11 Density of supply was calculated by summing the capacity of all sites inside or within one half-mile of the boundaries of each block group.
- 12 These thresholds represent roughly 67% and 200% of the median family income in the District (\$89,023 in 2016).
- 13 We estimate that 33% of children of working parents in a block group will receive early learning services near their place of work. This estimate was informed by previous research as well as an analysis of family commuting patterns for district funded pre-K3 and pre-K4.
- 14 Calculations exclude parkland and water when measuring area.
- 15 See Appendix III for a complete list of sources and methods.
- 16 An estimate of unregulated programs, obtained using NETS and InfoUSA databases, was produced to provide additional information on programs that are available to parents not operating within official early learning licensing guidelines. By including these programs, we get closer to the universe of early learning supply and can represent a more comprehensive estimate of supply. But these databases present certain limitations and challenges which require more validation than, for example, OSSE data. For example, studies using NETS data typically assess larger geographies, and point-level analysis using this dataset can be challenging due to a time lag in capturing facility openings and closings and industry misclassification (e.g., tutoring services being classified as early learning services). In the analysis process great care is taken to identify and remove misclassified sites.
- 17 Density of supply was calculated by summing the capacity of all sites inside or within one half-mile of the boundaries of each block group.
- 18 It was not possible to differentiate between full-time and part-time programs for some unlicensed programs due to data limitations with the business listings databases. For a list of variables provided by NETS, please see <http://exceptionalgrowth.org/downloads/NETSDatabaseDescription2013.pdf>.
- 19 It is possible for one location to operate multiple early learning programs. For example, a facility can have both a Head Start and a DC Public Schools Pre-K classroom. In these cases, the facility counted as one location and additional filtering was employed to avoid double counting of supply.
- 20 For those programs only in NETS or InfoUSA, capacity was estimated using a multiple regression analysis predicting capacity with the number of employees reported in the business directory. The result was an approximate 5:1 ratio of children to full-time staff listed in the business listings. This student to staff ratio generally aligns with the experience of Reinvestment Fund child care lending staff and with findings from the National Survey of Early Care and Education, see <http://www.researchconnections.org/childcare/studies/35519/version/4>.
- 21 Laughlin, Lynda. 2013. *Who's Minding the Kids? Child Care Arrangements: Spring 2011*. Current Population Reports, P70-135. U.S. Census Bureau, Washington, DC.
- 22 Illinois Action for Children, *Getting There: Cook County Parents' Commute to Child Care and Work*, June 2012; Deputy Mayor of Education, "Public Education Supply and Demand for the District of Columbia Elementary School Fact Sheet, SY2016-17" Nov 2017.
- 23 Three data sources are used to estimate demand: 1) Nielsen provides 2017 estimates of the zero to four population (baseline demand) in all census block groups; 2) the Census' Longitudinal Employer-Household Dynamic (LEHD) Program database provides the number of adults who live and work in all census blocks; and 3) 2011 American Community Survey data downloaded from IPUMS USA provides characteristics of working parents in the Washington, D.C., region. Information from LEHD and IPUMS USA are strictly used to estimate the share of children who may receive early learning services near their parent's workplace rather than home and are only relevant to the commuter adjusted and maximum potential demand.

About the Bainum Family Foundation

The Bainum Family Foundation combines proven expertise with a passion for supporting the whole child by providing integrated services to help them thrive. Our circle of collaboration includes investments and support in early learning, wrap-around services and knowledge building. Founded in 1968 by Stewart and Jane Bainum and based in Bethesda, Maryland, the Foundation has helped underserved children exit poverty through high-quality educational programs and services for 50 years.

About Reinvestment Fund

Reinvestment Fund is a catalyst for change in low-income communities. It integrates data, policy and strategic investments to improve the quality of life in low-income neighborhoods. Using analytical and financial tools, Reinvestment Fund brings high-quality grocery stores, affordable housing, schools and health centers to the communities that need better access – creating anchors that attract investment over the long term and help families lead healthier, more productive lives. Reinvestment Fund has been financing early childhood education facilities for over 25 years, with over \$30 million in investments. It has also conducted robust analyses of the supply of and demand for childcare in Philadelphia, Atlanta, Newark and Passaic County (New Jersey), identifying neighborhoods where high-quality care is most scarce and where investments are most needed.



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