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Measuring and Comparing Multiple Dimensions of Early Care and Education Access

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Overview

Introduction

Families across the United States face a variety of challenges securing early care and education (ECE) for their children. The supply and price of ECE programs in local areas tell part but not all the access story for families. To capture the complexity of ECE access from a family's perspective, a recently developed definition of *access* to ECE addresses multiple dimensions of the ECE experience, including the *effort* families make to find ECE programs with available slots, the *affordability* of ECE, the extent to which the arrangement *meets the needs of the parents,* and the ways the arrangement *supports children's development*.

Describing access across multiple dimensions provides decision makers with a deeper understanding of families' ECE needs and emphasizes the need for multi-faceted policy solutions. Yet measuring and comparing access from different perspectives requires available data and a clear measurement approach that can be conveyed concisely. This report describes an exploratory study using data from the 2012 National Study of Early Care and Education (NSECE) to model the complexity of ECE access and to consider how ECE access varies for families across the United States.

Primary research questions

1. What is the typical level of access for each of the access dimensions?
2. How does access differ across the dimensions for families of different income levels and different races and ethnicities?
3. What is the association between access and the type of primary care used by families with young children?

Purpose

The purpose of the research in this report was twofold: first, to examine how access varies across dimensions and for children and families with different characteristics; and second, to test a new research method using national data to capture families' experiences. The benefit of this national approach is that it uses common data across local areas to characterize and compare access. Findings from this research method can be reviewed with insights from other access measurement strategies including research conducted to identify child care deserts.

Key findings and highlights

Families have wide ranging levels of access to ECE across the United States, and access differs by the dimensions of access considered.

- Access, when measured based on total slots relative to the number of children, was, on average, below the threshold established by the child care deserts research (three children per slot) for families with preschool-aged children, but above the desert threshold for the average family with an infant or toddler.
- Nationally, half of families lived in areas where there were two preschool-aged children (or fewer) for every child care slot compared to 4.3 infants and toddlers for every slot.
- Expanding the measures of access to include various dimensions further illustrates the challenges families face in accessing the care they need and prefer, especially for infants and toddlers. The ratios capturing the access dimensions of supporting children's development and meeting parents' needs ranged from nearly seven to 10 infants and toddlers per slot.

- For infants and toddlers, low-priced care (under $5,000 annually) was essentially unavailable. Preschoolers also had very low access to low-priced care.
- Access to free care was somewhat more reasonable for preschoolers but unavailable for infants and toddlers.

The findings of this study confirm and expand on prior research identifying the problem of low access to ECE across the nation. Specifically, the methodology used in this study advanced knowledge in two key ways:

- First, by including measures of additional dimensions of access beyond supply, the study establishes that access to care with particular characteristics can be extremely low, particularly care that is affordable.
- In addition, by estimating a continuous measure of access, rather than a fixed threshold, the study illuminates the range of access issues across local markets and across dimensions.

Understanding the variation in access measures across local areas is an important next step for researchers. Future research on access should continue to consider multiple dimensions in addition to overall supply or availability to better assess the challenges families face in finding care that meets their needs. Child care research partnerships can supplement these types of analyses of access by collecting additional data about households' needs and about child care programs and teachers. Qualitative research can also provide more insights into how families make decisions about child care and balance multiple constraints, particularly in the face of limited options. Although our analyses were limited to center-based and non-relationship-based home-based providers, relationship-based providers, including family, friend, and neighbor care, play an important role in the supply of child care; future research should include supply and demand for relationship-based care in order to describe a full portrait of access.

Purpose

The purpose of this report is to describe an application of a family-centric, multi-dimensional definition of child care access to local levels using national data. This expanded definition of access states that *access to early care and education means that parents, with reasonable effort and affordability, can enroll their child in an arrangement that supports the child's development and meets the parents' needs* (Friese, Lin, Forry, & Tout, 2017). Applying this definition to the 2012 National Survey of Early Care and Education (NSECE) data allowed us to expand on previous child care access research by modeling the complexity of child care access and considering how child care access varies for families across the United States. This report highlights several methodological challenges to measuring access, including the need for local data that represent the different dimensions identified in the definition of access.

Introduction

Access to affordable, high-quality child care is critical for supporting parents' employment and for supporting children's intellectual and socioemotional development and school preparation. Under the 2014 reauthorization of the Child Care and Development Block Grant (CCDBG) Act, states are required to report their efforts to improve access to high-quality early care and education (ECE) and to provide evidence that parents receiving subsidies have the same access to ECE as other families. Access is a complex concept that incorporates multiple dimensions of availability, affordability, and "fit" between the family and provider (Pechansky & Thomas, 1981). Research on barriers to access in child care has focused on location, transportation, lack of information, hours of operation, affordability, and the need for culturally or linguistically appropriate care (see, for example, Crosnoe, Purtell, Davis-Kean, Ansari & Benner, 2016; Coley, Votruba-Drzal, Collins & Miller, 2014; Meyers & Jordan 2006).

Despite acknowledging the multifaceted nature of access, many studies of access have focused primarily on supply or availability often because of data limitations (Thomson, Cantrell, Guerra, Gooze, & Tout, forthcoming). One common measure of access is a ratio of "slots per tot," or its inverse, children (or tots) per slots (i.e., the number of children living in an area divided by the number of children who could be served ["slots" or provider capacity] in that same area). The number of children (of different ages) approximates potential demand, and slots count potential (maximum) available supply (Friese et al., 2017). Studies may use measures of the supply of care with particular characteristics, such as offering care during nonstandard hours, and estimate the number of children with parents working those hours (e.g., Sandstrom et al., 2018). Studies have also refined the definition of potential demand by considering parental employment to estimate the number of children who may need care. Other evidence of a lack of access or shortages of supply comes from reports of parents having difficulty finding care and from descriptions of multiple arrangements cobbled together by parents to cover care for children of different ages (Chaudry, 2004).

Areas with limited or no access to child care have been described as "child care deserts" similar to the concept of "food deserts" with few or no grocery stores in a specific geographic area (Dobbins, Tercha, McCready, & Liu, 2016). Child care deserts are defined by measuring the amount of supply relative to the number of children in the local area. Some studies define child care deserts specifically in relation to the lack of availability of high-quality child care. The Center for American Progress has defined a child care desert as a local area with more than three children for every child care slot (Malik & Hamm, 2017; Malik, Hamm, Lee, Davis & Sojourner, 2020), although no research basis is provided for this threshold.

Researchers in several states have created access measures based on several characteristics of care, often with a focus on access for families receiving child care subsidies. Work in Illinois focused on several dimensions of care salient to families receiving subsidies, including nonstandard hour care and infant care (Sandstrom et al., 2018). The "Index of Child Care Accessibility," developed by Herman Knopf and his team, combined data on the proportion of children receiving subsidies enrolled in high-quality ECE programs with data on the capacity of local high-quality programs and used this index to identify areas for policy interventions (Knopf, Sherlock & Zhou, 2018). In Minnesota, access measures were developed accounting for capacity relative to the number of nearby children, price, and quality rating (Davis, Lee & Sojourner, 2019). Much of the work on access measures has used mapping visualizations to demonstrate variation in access across a state or local area. While most of the mapping projects rely on administrative units such as ZIP codes or census tracts, Davis, Lee, and Sojourner (2019) developed measures of access based on driving time between family and provider locations. For the most part, these studies focus on a single state and contribute to understanding child care access in different locations. The current report adds to the previous literature by providing an assessment of access using nationally representative data.

Moving beyond a focus on supply requires conceptualizing access in a way that captures more than if supply in the area is sufficient to meet (potential) demand. Access implies that there is care that the family considers to be available, affordable, and has the characteristics desired by the family. To address the need for researchers and policymakers to have a common understanding of access, an expert group of researchers and state and local administrators developed a definition of access. The definition improved on existing concepts of child care access by placing families, their needs, their preferences, and their experiences searching for and finding care at the center. The definition states: *access to early care and education means that parents, with reasonable effort and affordability, can enroll their child in an arrangement that supports the child's development and meets the parents' needs* (Friese et al., 2017). Each of the four interrelated dimensions identified in this definition – reasonable effort, affordability, supports the child's development, and meets parents' needs – is critical to understanding families' experiences. Previous child care access methodologies, those that balance ratios of number of slots to number of children, are insufficient for capturing this family-centric definition. New methodologies that capture features such as family needs and preferences are required.

Research Objectives in Brief

We applied the multi-dimensional definition of access to a quantitative analysis of child care access at the national level using local data collected in the 2012 NSECE. Our purpose was to test a new methodological approach that would better match the multi-dimensional definition and compare insights from this new method to insights from existing methods, such as the child care deserts work. In addition to exploring a new methodological approach to measuring the multiple dimensions of access, this report provides findings on three research objectives:

1. Describe the typical or median level of access for each of the four dimensions and the variation in the measures across local areas
2. Compare access across dimensions for families of different income levels and different races and ethnicities
3. Examine the association between access and the type of primary care used by families with young children

Methodology in Brief

Building on previous work; we utilize a "tot per slot" methodology in which we estimated a count of children for every one child care slot within a particular area. The primary difference between our methodology and that of previous studies is that we calculated multiple "tot per slot" ratios, called **access ratios**, to measure access on each dimension. We calculated access ratios for measures of reasonable effort, affordability, meeting parent's needs, and support for children's development separately. Each access ratio is based on the same premise: comparing the number of children from families with certain characteristics (e.g., families with low income) to the number of slots with certain characteristics (e.g., that are free).

Ideally, to capture access as a multi-dimensional construct, one would want to examine multiple dimensions or characteristics concurrently (e.g., high-quality, affordable care available at nonstandard hours). Because this was our first use of the methodology and because small sample sizes precluded combining multiple dimensions, we calculated access ratios one dimension at a time.

Data and measures

We used the 2012 NSECE, which is composed of four rich, unique, nationally representative surveys that describe center-based and home-based child care; the center-based and home-based child care workforces; and households with young children. Specifically, all four survey datasets, Center-Based, Center-Based Workforce, Home-Based, and Household Survey datasets[1] were used in these analyses.

Slots were summed for center-based and non-relationship-based, home-based providers who appeared on state or federal lists or registries of ECE providers (henceforth referred to as listed non-relationship-based, home-based providers).[2] Current enrollment numbers reported by providers were used instead of capacity due to the availability and quality of the data.[3] We combined the two

[1] Data used in the analysis included restricted use data. For more information on the NSECE, including its questionnaires and available data, visit: https://www.acf.hhs.gov/opre/research/project/national-survey-of-early-care-and-education-2019

[2] Only listed non-relationship-based, home-based providers were included for three reasons. First, unlisted providers (mostly family, friend, and neighbor care) were sampled differently from center-based and listed home-based providers, and thus, their enrollment totals could not be combined with center-based and listed home-based providers. Second, we excluded relationship-based providers because these providers were not asked the same questions as non-relationship-based providers, so there were limitations to the access ratio variables they could inform. In addition, relationship-based providers are not available to all families, since they serve only those they knew previously. Thus, while relationship-based providers are an option that many families choose, they are not necessarily in the available supply of ECE in the same way that non-relationship-based, home-based providers or center-based providers are.

[3] Although the 2012 NSECE asked providers how many additional children of a single age year they could serve, many of these values were implausibly high. This may have been due to providers double-counting the number of children they could serve (e.g., if providers reported they could serve an additional three 3-year-olds, three 4-year-olds, and three 5-year-olds, it was unclear if this meant they had three total slots open for children of any age between 3–5 or nine total slots open). Also, some providers indicated that an infinite number of slots could be added.

provider types to characterize the supply of child care and did not assume that any one provider type would be sufficient to meet the demand of families in a given area.

Defining areas and child counts

To capture the local nature of access, the methodology used in this study estimated the number of children for every slot in the same geographic area. The definition of a local area was the primary sampling unit (PSU) of the 2012 NSECE, which was a county, or in the case of counties with low population density, a contiguous set of counties. The locations of the PSUs were unknown to the research team and are not disclosed in this or any report.

The number of children in each PSU was determined from the household survey data using weighted counts. We estimated the number of children in two age groups: infants and toddlers (0- to 35-months) and preschoolers (36- to 72-months and not yet in kindergarten).[4]

Defining each access ratio by dimension

Table 1 identifies the key access ratio measures described in this report. Several indicators of each access dimension were considered, and indicators were chosen based on their availability in the 2012 NSECE data. Access ratios were estimated separately by child age (infants and toddlers; and preschoolers). In brief, the access ratios for each dimension include:

- **Reasonable effort:** For this dimension, we examined the number of children for every slot (for the two age groups: infants and toddlers; and preschool-age children). This ratio can be viewed as an overall measure of access. When there were fewer children than the number of slots, we assumed that finding a slot will require less effort by parents.
- **Affordability:** Rather than trying to estimate affordability for each family based on income and family structure, we took a simpler approach based on the number of slots at different price points (< $2,500/year, < $5,000/year, and < $10,000/year) and free slots. Annual price was calculated based on the price reported by the provider, assuming full-time care. The affordability access ratios were estimated two ways: first, for all children and second, for children in families with incomes less than 200 percent of the federal poverty level (FPL). Thus we could compare access to lower-priced, higher-priced, and free care for families within the lower income group as well as for all families. If there were fewer children in an area for each lower-priced slot, we assumed that parents had greater access to lower-priced care.
- **Meets parents' needs:** For this dimension, we examined the number of children in households with parents who work during nonstandard hours[5] for every slot offered at nonstandard hours (i.e., defined as care available any time between 7 p.m.–6 a.m. and on weekends). While this indicator measures only one type of parent need that may affect access, the need for nonstandard hour care an important policy concern.
- **Supports child's development:** To estimate an access ratio for care that supports children's development, we used a measure of the availability of teachers with educational credentials. For this dimension, we examined the number of children for every slot with a provider whose (randomly selected) teacher had a two-year or four-year degree. We also examined the number of children for every slot with a provider whose (randomly selected) teacher had a Child Development Associate (CDA) or a state certification to teach early childhood.

[4] Each household in the survey reported the number and ages of children. These numbers, when weighted appropriately to account for the sampling design, provided an estimate of the total number of children in each age group in the PSU. To estimate the number of children in low-income families, we used the same data on the number and ages of children but only for households with reported incomes below 200% of the Federal Poverty Level (FPL). We then also estimated the subset of children in each age group whose parents worked nonstandard hours (e.g., evening, overnight, or weekends). The information on household characteristics was drawn from the 2012 NSECE Household Survey Database.

[5] This includes a single-parent household in which the parent works nonstandard hours or a two-parent household in which one or both parents work nonstandard hours.

As detailed in the Access Guidebook (Friese et al., 2017), each of the four dimensions has many other indicators. For this study, we selected indicators that were available in the 2012 NSECE and that had sufficient data. For example, many experts consider having a child care provider who speaks the same language as the child's household an indicator of care that supports a child's development (Hill & Torres, 2010; Mundt, Gregory, Melzi, & McWayne, 2015); however, there were many PSUs with no or too few providers who spoke a language other than English to appropriately estimate an access ratio of care available in the child's home language. Similarly, care at nonstandard hours meets the needs of certain parents, while other parents do not need formal care for children at those hours but may need care that provides transportation. Reasonable effort might involve greater access to information about providers or availability of open slots. Access ratios that capture additional indicators of the four dimensions could be explored using the methodology introduced in this report if the data are available.

Table 1. Construction of access ratios: tots per slot in a local area[i]

A	B	C
Tots per slot = divide Column B by Column C	**Number of children by age group** • **Infants and toddlers** • **Preschoolers**	**Number of center-based and listed home-based[ii] slots[iii]**
Reasonable effort ratios	Total number of children by age group	Total slots
Affordability ratios	Number of children in a family with an income below 200% FPL and all families (by age group)	Number of slots that have a full-time, annual (non-zero) price of: • $2,500 or less • $5,000 or less • $10,000 or less or are free to parents
Meets parents' needs	Number of children with parents who work nonstandard hours (by age group)	Number of slots that are available during the hours of 7 p.m. and 6 a.m. and on weekends
Supports child development	Total number of children by age group	Number of slots with a teacher with a CDA or state certification Number of slots with a teacher with a two- or four-year degree

Notes:
i. Local area is the Primary Sampling Unit (PSU) area defined by the 2012 NSECE.
ii. Listed home-based slots for this analysis do not include unlisted providers or relationship-based providers.
iii. The count of slots by age is based on enrollment due to data limitations.

Analyses

The access ratios were calculated for each PSU, and these values were then appended to the household-level data. All households in the same PSU have the same value for a given access measure. Thus, the access ratios can be viewed as characteristics of the area in which the family lived. Analyses were conducted at the household level for households with at least one child in the infant and toddler or preschooler age range. The analyses were conducted across the entire nationally representative sample using PSUs. By conducting household-level analyses, findings were weighted to be nationally representative measures of households' local access to care.

The analysis addressed three research objectives:

1. **Describe access for each dimension.**
    - What is the median "tots per slot" across each access dimension? The median describes access for the typical family.
    - What does access look like at the higher and lower ends of the access ratio distribution? The 25th and 75th percentiles provide information on the range of how low (or high) access is for families in different areas of the U.S.
2. **Describe access by subgroup.**
    - Is access different for families of different races, ethnicities, and income levels? What is the median number of children per slot, and are families with certain characteristics more likely to live in the more extreme ends of the distribution than other families?
3. **Examine the association between access and type of primary care used by families with young children.**
    - Is there an association between the median access ratios for different dimensions and the type of primary care used? Are families living in the lower- and higher-access areas more or less likely to use a certain type of child care as the primary arrangement for their child (including not using any form of nonparental care)?

The main findings are reported in terms of the median access ratios for each dimension and for different subgroups of families. In addition to reporting the median access ratios, this study also reports the 25th and 75th percentiles to examine higher and lower levels of access for each dimension. The median access ratios by themselves provide only part of the picture of access across locations and for different types of families. Half of all families had lower access than the median value, and half had higher access. By examining the percentiles (or distribution) of access ratios, we gathered more information about how limited access is in some areas and if some types of families are more likely to live in areas with very limited access. Rather than setting a single threshold for low access, we used the 75th percentile of each access measure to identify families who live in areas of lower access. Families in lower-access areas were families in the top 25 percent of the distribution on a particular access ratio; that is, their access ratio was above the 75th percentile value of the access ratio for all PSUs. Families in higher access areas were families in the bottom 25 percent of the distribution on a particular access ratio. Thus, families in areas with lower access live in areas with more children (with particular characteristics) for every slot (with particular characteristics) while those with higher access live in areas with fewer children for every slot in the area.

Using logistic regression, we examined if living in a lower- or higher-access area was associated with the type of primary care used. In other words, we examined the percentage of families in lower and higher-access areas using each type of primary care to see if higher or lower levels of access to care were associated with the percentage of families using each type of primary care. More detail on the methods and the findings specific to lower-access areas are found in the Appendix A.

Findings

This discussion of the descriptive statistics of the **access ratio variables** is organized by access dimension. A summary of findings is presented in Table 2.

Reasonable effort: overall availability of slots

What was the median access ratio for U.S. families with young children?

Based on total slots relative to the number of children, the overall median access ratio was 1.6 children

per slot for families with preschool-aged children and 4.3 children per slot for families with an infant or toddler. These findings are consistent with previous research indicating that parents of infants and toddlers have more difficulty finding child care than parents of preschoolers (Corcoran & Steinley, 2019). Compared to the threshold set in the child care deserts research (three children per slot), the median access ratio nationally was lower than the threshold for families with preschool-aged children but higher than the desert threshold for a family with an infant or toddler.[6] The distribution of the values of the overall access ratio demonstrates that access was lower in some areas, particularly for infants and toddlers. The 75th percentile for families with infants and toddlers was 6.4 infants and toddlers per slot. In contrast, the 75th percentile was 2.7 preschoolers per slot, below the standard cutoff for child care deserts.

Affordability: low-price and free care

How many children were there for each slot at various price points per PSU? We considered multiple price points (free care, and care priced at ≤$2,500, ≤$5,000, and ≤$10,000/year) and determined how many slots were available at these price levels for each age group.

When looking at the dimension of reasonable effort (measured by the overall availability of slots), the findings suggest that most families with preschoolers had access, but families with infants and toddlers had less access. When limiting supply to include only the more affordable providers, the access ratios worsened, especially for infants and toddlers. Results for all families are shown in Table 2 along with those for families with incomes below 200 percent FPL. The differences in median ratios among all families and families with incomes below 200 percent FPL were not statistically significant, so researchers mainly focused on the results for families with incomes below 200 percent FPL in this discussion. Note that some slots, particularly those free to families, had income-eligibility requirements and so were not truly accessible to all families.[7] For this reason, free care was treated as a separate category from low-priced care (which includes slots that have a non-zero price).

Looking first at the availability of free care, all families, regardless of child age or income, lived in areas with at least one free provider (although not all families would be eligible to use a free provider). Despite the presence of free providers, the ratio of tots per slot indicated that most families experienced very low access to free care for infants and toddlers. The median of 45 means that half of families lived in areas where there are at least 45 children from families with incomes below 200 percent FPL for every free child care slot. When all children (rather than just children from families with incomes below 200 percent FPL) were considered, the median ratio jumped to 66.6. In contrast, free care was more common for preschool-age children. The median access ratio was 3.8 preschoolers for every free child care slot for families with incomes below 200 percent FPL. The median ratio increased to 6.3 preschoolers per free slot when preschoolers in families from all income ranges were included. However, most free care was available only to families with low incomes.

To examine care that was not free to parents, we identified three annual price points ($10,000, $5,000, and $2,500). Figure 1 illustrates how the access ratios increased at lower price points. In other words, families had lower access to low-priced care than to higher-priced care. This was particularly pronounced for families with infants and toddlers. For families with incomes below 200 percent FPL, the overall median tots per slot was 4.4 for infants and toddlers, which increased to 8.3 infants and toddlers per slot when slots were limited to those with an annual price of $10,000 or less. Restricting slots to those costing no more than $5,000, the median rose to 63 infants and toddlers per slot and rose to 235 per slot that cost $2,500 or less (but more than zero). In addition, a sizeable proportion of families lived in areas with no providers offering care at a low price defined as $2,500 per year. Nearly

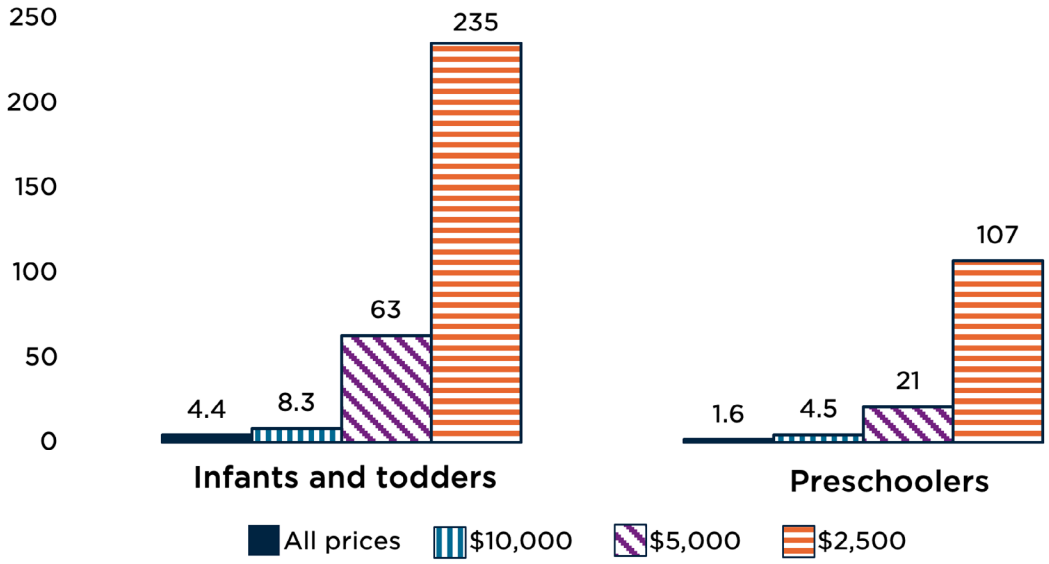
[6] The ratio of 3:1 has not been validated as the appropriate threshold for determining sufficient or low access to child care. However, we include it as it is a reference point recognizable to many readers. Because we do not know parents' actual preferences, it may be that the threshold for adequate access for care of certain types would be higher (or lower) than the 3:1 ratio. For example, not all parents who work nonstandard hours will want to use formal care for their infants. If a family chooses not to place their child in any type of formal care, the child is still counted in the ratio (numerator). Nonetheless, he access ratios provide important information about relative access of different dimensions for families in different locations.

[7] In this context, "free care" refers to care in formal settings that is provided at no charge to families and excludes care by family, friends, or neighbors.

one-quarter (23%) of families with infants and toddlers with incomes below 200 percent FPL and 25 percent of all families with infants and toddlers lived in areas that have **no** providers with a non-zero price that was **$2,500 or less** annually for infant and toddler care (excluding free care).

A similar relationship between the median access ratios and prices was found for preschoolers, although the ratios were lower, indicating more access for preschoolers than for infants and toddlers. As shown in Figure 1, for families with incomes below 200 percent FPL, the overall median tots per slot was 1.6 for preschoolers, which increased to 4.5 preschoolers per slot when slots were limited to those with an annual price of $10,000 or less. Restricting slots to those priced at no more than $5,000, the median rose to 21 preschoolers per slot, and was 107 per slot when limited to slots priced at $2,500 or less (but more than zero). For families with preschoolers, 14 percent of families with incomes below 200 percent FPL and 13 percent of all families with preschool-aged children lived in areas that have no providers priced at $2,500 or less for preschool-aged care. Notably, only 2 percent of families with incomes below 200 percent FPL with preschool-aged children and 2 percent of all families with preschool-aged children lived in areas that have no providers priced at $5,000 or less for preschool-aged care. The results again demonstrate the wider availability of care for preschoolers than infants and toddlers, especially when prices were considered. However, access ratios of 21 children per slot or higher indicates that access to low-priced care was limited for most families.

Figure 1. Median number of children per slot at different price points, excluding free care, for families with incomes below 200 percent FPL



Source: Authors' analysis of the 2012 NSECE center-based provider, home-based provider, and household restricted use data.

Supports the child's development

How many children were there for each slot in programs with teachers with two- or four-year college degrees or teachers with CDA or state certifications to teach young children?

Access to programs with teachers with a **CDA or state certification** to teach young children was, generally, higher than access to programs with **degreed teachers**, and access was higher for families with preschool-aged children than families with infants and toddlers. For instance, nationally, a family with the median level of access lived in areas where there were at least 8.7 infants and toddlers for every child care slot in a program that served infants and toddlers with a **degreed teacher**. In comparison, access to programs with at least one degreed teacher was higher for families with preschool-aged children. A family with the median level of access lived in an area where there were 2.8 preschool-aged children to every child care slot in a program with a degreed teacher.

Access to teachers with a CDA was slightly better. Nationally, half of families lived in areas where there were 6.9 infants and toddlers to every child care slot in a program that served infants and toddlers with a teacher with a **CDA or state certification** to teach young children. The median level of access for families with a preschool-aged child was 2.2 preschool-aged children to every child care slot in a program that served preschoolers with a teacher with a CDA or state certification to teach young children.

Areas with lower access to teachers with degrees or a CDA had 11 or more infants and toddlers per slot and about 4 preschoolers per slot (using the 75th percentile to indicate lower access). The results consistently show access was higher for families with preschool age children than for those with infants and toddlers.

Meets the parents' needs: hours of operation

How many children were there for each slot in programs that are open at nonstandard hours?

Access to programs that operated at nonstandard hours was generally low. Access was somewhat higher for families with infants and toddlers than for families with preschoolers among families who work nonstandard hours. Nationally, half of families who worked nonstandard hours lived in areas where there were at least 9.9 infants and toddlers to every child care slot in a program that operated at nonstandard hours. The median access ratio was only slightly greater for families with preschool-aged children. Nationally, half of families who worked nonstandard hours lived in areas where there was a minimum of 13.4 preschool-aged children to every child care slot in a program that operated at nonstandard hours. At the 75th percentile, one quarter of families with infants and toddlers lived in areas with at least 18 children per slot in a program that operated during nonstandard hours. For preschoolers, one quarter of families lived in areas with 29 or more children per slot in a program that operated during nonstandard hours.

Access by Subgroup

Does access differ by family race and ethnicity?

Table 3 presents the median number of children per slot by four categories of family race and ethnicity: White non-Hispanic, Black non-Hispanic, Hispanic, and "Combined Other" (which included Asian, American Indian, Native Hawaiian, Pacific Islander, Other race, and Multi-racial, two or more races). The combination of multiple disparate racial categories into a single "Combined Other" category was necessitated by small sample sizes. Findings regarding families categorized in the "Combined Other" race were difficult to interpret, given the variety of racial identities that compose this group.

Families with infants and toddlers

Overall, the median access ratios for the different dimensions were similar across the race/ethnicity groups, and only a few of the differences were statistically significant. In terms of **overall availability**, the median level of access to care for infants and toddlers was lower for Hispanic families compared to that of White or Black families (median access ratio of 5 versus 4 and 4.1 children per slot respectively). The median ratios for overall availability for families with preschoolers were nearly identical across the race/ethnicity categories.

The median access ratio for care priced at $5,000 per year or less (and not free) was similar across race/ethnicity groups, except for the Combined Other category. Families in the Combined Other race category lived in areas with significantly lower levels of access to **care priced at $5,000/year** or less compared to Hispanic families (81.5 versus 62.9 children per slot). With regards to **care priced at $10,000/year or less,** White and Black families had greater access compared with families who

were Hispanic or in the Combined Other race category (6.9 and 8.3 versus 11.6 and 11.2 children per slot, respectively). Notably, the median number of children per slot was nearly 70 percent higher for Hispanic families than for White families.

Access to a **degreed teacher** was greater for Black families compared to Hispanic or White families (7.8 versus 9.3 and 8.9 children per slot, respectively). Access to a teacher with a **CDA or state certification** to teach young children did not differ by race and ethnicity.

Access to care at **nonstandard hours** was lower for Hispanic families compared to White or Combined Other race families (11 versus 8.4 and 8.4 children per slot, respectively). In addition, access to care at nonstandard hours was lower for Black families compared to White families (10.9 versus 8.4 children per slot).

Families with preschoolers

There were few differences among families with preschoolers by race and ethnicity. No differences by race and ethnicity were observed for **overall availability** or access to **care priced at $5,000/year** or less.

Access **to care priced at $10,000/year** or less was lower for Hispanic families compared to Black families (4.6 versus 4.2 children per slot). However, in terms of **free care**, Hispanic families had greater access than White families (4.8 versus 6.7 children per slot).

There were no differences in access to a **degreed teacher** by race and ethnicity.

In terms of access to care at **nonstandard hours**, families within the Combined Other race category lived in areas with greater access than White families (10.3 versus 13.9 children per slot).

Does access differ by family income?

The median number of children per slot was examined by two categories of family income: families with low income, defined as less than 200 percent of FPL, and families with income greater than 200 percent FPL. Findings are presented in Table 4.

Families with infants and toddlers

There were few differences between families with infants and toddlers by income status. No differences by income were observed for **overall availability** or access to **care priced at $5,000/year** or less. The average family with income greater than 200 percent FPL had greater access to care priced at **$10,000/year** or less compared to families with incomes below 200 percent FPL (8.3 versus 10 children per slot). No differences by income were observed for access to care from providers with a **degreed teacher** or teacher with a **CDA or state certification** to teach young children or to care offered at **nonstandard hours**.

Families with preschoolers

There were also few differences between families with preschoolers by family income. No differences by income were observed for **overall availability** or access to **care priced at $5,000/year** or less. Families with incomes below 200 percent FPL had greater access to **free care** compared to those with incomes above 200 percent FPL (median ratio of 5.1 versus 6.5 children per slot).

No differences by income were observed for access to care from providers with a **degreed teacher** or teacher with a **CDA or state certification** to teach young children or to care offered at **nonstandard hours**.

Does access differ by type of primary care used?

To examine the association between access and the type of primary care used, we conducted two analyses. First, families were grouped based on the primary type of care used: center-based care;

home-based, paid child care from a provider the child/family did not previously know (referred to as home-based paid, no prior relationship); unpaid home-based care (e.g., family, friend, and neighbor care); and parental care only (i.e., child does not regularly use any non-parental child care arrangement).[8] Then the median number of children per slot for families in these four groups was calculated. These findings are presented in Table 5.

Second, using logistic regression, we examined if living in a lower- or higher-access area was associated with the type of primary care used; meaning, we examined the percentage of families in lower- and higher-access areas using each type of primary care to see if higher or lower levels of access to care were associated with different proportions of families using each primary type of care. Findings are presented in Table 6 for infants and toddlers and in Table 7 for preschoolers.

Families with infants and toddlers

Only one significant difference in median access ratios by primary type of care for infants and toddlers was observed: families who used center-based care as the primary type of care for their infant or toddler lived in areas with greater overall availability compared to families who used unpaid home-based care or parental care only as their primary type (3.6 versus 4.4 and 4.5 children per slot, respectively). The proportion of families using different primary types of care in lower- versus higher-access areas followed the hypothesized pattern, but the differences were not statistically significant. For example, the proportion of families using parent care only was 45 percent in lower-access areas compared to 37.5 percent in higher-access areas. Eleven percent of families in lower-access areas used centers for infants and toddlers compared to 15 percent in higher-access areas.

Two significant differences in the proportions of families using center-based care in lower- and higher-access areas were observed. Approximately 20 percent of families with infants and toddlers who lived in areas with higher access to a **degreed teacher** used center-based care, which was significantly higher than the proportion of families who used center-based care in lower-access areas (11.6%). A similar finding emerged for access to a teacher with a **CDA or state certification** to teach young children, with 15 percent of families in higher-access areas using center-based care as their primary care type, compared to only 9 percent of families in lower-access areas. No other differences in the proportions using each type of care by lower- or higher-access areas emerged.

Families with preschoolers

We observed no significant differences in average access by primary type of care for preschoolers and no differences in the proportions using each type of care by lower- and higher-access areas.

Summary of Findings

Families have wide ranging levels of access to care across the United States, and access differs by the dimension of access considered. Previous work measuring overall slots per child masks many realities of the types of care families need and prefer and usually lacks information about the quality of available care. Using nationally representative data, this study found that the access ratio, when measured based on number of children relative to the number of slots, was, on average, below the threshold set in the child care deserts research (3 children per slot) for families with preschool-aged children, but above the desert threshold for the average family with an infant or toddler. **Nationally, half of families lived in areas where there were two preschool-aged children (or fewer) for every child care slot for that age group compared to 4.3 infants and toddlers for every slot for that age group.** This finding is consistent with previous research showing that parents of infants and toddlers have more difficulty finding child care than parents of preschoolers (Corcoran and Steinley, 2019).

Previous work has demonstrated that families experience differential access depending on where they live (Malik & Hamm 2017). This study similarly found variation in slots per tot across local areas.

[8] These four care arrangements represent the primary types of care used by 90% of infants and toddlers and preschoolers. The other 10% of young children use irregular arrangements or primarily use care in other settings, such as K-12, which has too low a prevalence to estimate as a separate type.

However, expanding the measures of access to include the various dimensions further illustrates the challenges families face in accessing the care they need and prefer, especially for infants and toddlers. **The ratios capturing the access dimensions of supporting children's development and meeting parents' needs ranged from nearly seven to 10 infants and toddlers per slot**. Preschoolers had higher access to care from degreed or certified teachers compared to infants and toddlers, and access to programs with teachers with CDAs was higher than access to teachers with bachelor's degrees for infants and toddlers. Given the relative dearth of nonstandard hours slots per child in most areas, families who work during nonstandard hours may find it challenging to access care for those hours. Thus, looking beyond the total numbers of slots to incorporate dimensions of care that are important to families is necessary to obtain a more nuanced picture of access.

Another key dimension of access is affordability. We found that access ratios were much higher (meaning access is lower) when examining the availability of low-priced or free care than the total slots per child ratios. **For infants and toddlers, half of families lived in areas where there were at least 50 infants and toddlers from families with low incomes for every child care slot priced at or below $5,000 annually**. In other words, low-priced care was essentially inaccessible for these families. **The comparable ratio for preschoolers was 13.5, which also signals very low access to care at this price**. Access to free care was somewhat more reasonable for preschoolers. **The average family with income below 200 percent FPL lived in an area with 3.8 preschoolers per free slot but more than 45 infants and toddlers per free slot for that age group.** While there was more access to care costing $10,000 per year, many families will find that amount challenging to afford.

This analysis of the relative availability of specific types of slots confirms the challenges families face in balancing the multiple dimensions of care they need. Access differs by dimension, and some dimensions are not truly accessible at all based on our findings of children per slot ratios. **The findings suggest many families face very limited options, particularly for infants and toddlers.** Access dimensions across local areas varied, however, and access may vary by families' demographic and economic characteristics. For example, as shown in Table 1, families with infants and toddlers at the low end of access ($\geq$ 75th percentile) lived in areas with 6.4 children or more per slot while those with better access (the $\leq$ 25th percentile) lived in areas with 2.9 or fewer children per slot. For certain dimensions, the ranges between the 25th and 75th percentiles were much wider. Regarding slots priced at $5,000 per year or less, the interquartile range was 29-173 for infants and toddlers and 12–42 for preschoolers.

Findings revealed few differences in access by family race and ethnicity. Among families with infants and toddlers, Hispanic families, on average, had lower access to infant and toddler care overall, and infant and toddler care priced at $10,000/year or less compared to White and Black families. In contrast, Hispanic families with preschoolers had higher access to preschool care, overall, than White families. Findings regarding families categorized as Combined Other race were difficult to interpret given the variety of racial identities that compose this group (defined because of small sample sizes).

Findings did not reveal many differences in access for families with incomes above and below 200 percent FPL in terms of access, except for free care. **Compared to families with income above 200 percent FPL, families with income below 200 percent FPL, on average, lived in areas with higher access to free care, but the access was still low overall.** Thus, while the supply of free care may be somewhat responsive to the presence of more families with low incomes, it does not seem sufficient to address estimated demand based on the number of children.

Living in a lower- or higher-access area may impact the type of care that families use. No clear picture emerged, however, **since the primary care used was not significantly associated with most of the access ratios**. This may be due to the fact that child care decision making is very complex and not based on one aspect of the supply.

In sum, by taking a national look at local child care markets with a family-centric methodology, we found that, in general, families had low access to center-based and listed home-based care. In addition, families had even lower access to care that met certain characteristics, including affordability

and care that met certain structural quality indicators such as teachers with credentials or degrees, particularly for infants and toddlers. Our findings suggest a substantial proportion of families live in areas with extremely low access, particularly families with infants and toddlers. For example, a quarter of families with low income with infants and toddlers lived in areas where the minimum number of children for every free slot was greater than 90, and a quarter of families with infants and toddlers lived in areas where the minimum number of children for every slot in a program with a degreed teacher was nearly 15. Given the paucity of child care slots in centers and listed homes, particularly affordable slots for infants and toddlers, families across the U.S. are making child care decisions based on very constrained sets of options. It is no surprise, then, that the most common primary nonparental child care arrangement for infants and toddlers was family, friend, and neighbor care.[9]

The findings of this study confirm and expand on prior research demonstrating the problem of low access across the nation. Specifically, the methodology used in this study advanced knowledge in two key ways. First, by including measures of additional dimensions of access, the study demonstrates that access to care with particular characteristics can be extremely low, particularly with regard to affordability. Second, by estimating a continuous measure of access rather than a fixed threshold, the study illuminates the range of access issues across local markets and across dimensions. Understanding the variation in these measures across local areas is an important next step for researchers.

Study Limitations

Access is a complex concept, and analysis of families' level of access necessarily involves assumptions that should be kept in mind when interpreting the findings or considering their policy implications. Some of the assumptions in this study were driven by limitations of the data and survey sampling, while other assumptions reflect analytic decisions that could be revised in future work. Each of the four dimensions of access in the definition is itself multidimensional, and different indicators could have been used (subject to data availability) to capture these dimensions.

Access is a local concept because families search for child care near their home or work. Rarely, however, are highly detailed data available on families and providers in local markets. For this analysis, we considered the 2012 NSECE PSU representing the local area in which a family searches for child care. The analysis thus assumes that all families within the PSU have the same level of access, regardless of where in the PSU they live. However, it is likely that a PSU will contain several local child care markets, and access for families will vary within the PSU. Recall that PSUs in the 2012 NSECE are counties or sets of contiguous counties, and their identities are never revealed to researchers. Thus, the area definition used in this study was based on the administrative boundaries of counties, which may not reflect the area in which a family will search for care. (It may be either too large or too small.) A few studies have had more precise location data and have used a radius of distance or driving time around a location to measure local availability (Davis, Lee & Sojourner 2019; Malik, Hamm, Lee, Davis & Sojourner 2020). The lack of clear patterns of association found in this study between living in low- or high-access areas and type of primary care could, in part, be a result of restriction to PSU-level analysis (and other methodological decisions).

Another important methodological decision was to define high and low access based on the distribution of the access measures. Specifically, we used the upper and lower quartiles of each access measure to define high and low access for that measure. Other approaches to defining thresholds might illuminate different trends in access. For example, one could set a common threshold for each access dimension, such as the "child care deserts" definition of three children per slot. However, converting from continuous measures (such as average children per slots or percentage of families) to a binary measure (above or below a threshold) would have masked much of the interesting detail across dimensions and subgroups shown in this report. Finally, our analyses combined groups of

[9] Estimated from 2012 NSECE by the authors, defining family, friend, and neighbor care to include paid and unpaid care from a home-based ECE provider with whom the family had a prior relationship.

children in ways that may have masked important differences in access. We looked at slots combined across age groups: infants and toddlers (0- to 35-months) and preschoolers (36- to 72-months-old). Supply and demand for care varied by specific child ages; for instance, as found in the 2012 NSECE, 61 percent of 3-year-olds regularly used nonparental child care, while 85 percent of 5-year-olds regularly used nonparental child care (NSECE Project Team, 2016). Breaking out the age groups further could reveal different patterns of access. Also, due to small sample sizes, we were unable to examine families who identified as Asian, American Indian, Native Hawaiian, Pacific Islander, Other race, and Multi-racial, or two or more races separately. Results regarding this "Combined Other" group were difficult to interpret and do not necessarily illustrate access for any ethnicity in the group.

Directions for Research

An important consideration for future research is to collect data on capacity, rather than enrollment, to measure access. Due to data availability and data quality concerns, we were limited to using enrolled slots rather than measures that might be preferred, such as licensed capacity, potential slots or desired enrollment. This study combined centers and listed home-based slots, while other studies may focus on licensed providers or only one type of provider. Future research on parents' willingness to use different types of care will help illuminate questions about access. Also, we did not separately consider access for infants (instead combining infants and toddlers), although other studies have suggested that shortages are most acute among this age group (Schochet, 2019).

A second important consideration for future research is to develop better constructs for measuring demand. Current work relies on child population totals, or some portion of the total, to represent demand. These population-based measures of "potential demand" provide an important benchmark; however, not all parents want to use centers and listed home-based providers. Empirical studies of demand models can provide insights into parents' decision making; however, past studies have largely been limited by lack of data on local options available to parents. Further, these models only inform researchers about the care parents use given the limited options available. Further research on the relationship between access and characteristics of families in a local area may help shed light on the interaction of supply and demand factors.

Future research on access should continue to consider multiple dimensions in addition to overall supply or availability to better assess the challenges families face in finding care that meets their needs and preferences. Considering multiple dimensions simultaneously, as families must do when choosing their child care settings, reveals even more limited access but is also challenging analytically. Ultimately, a community-level measure of access, such as children per slots, differs from understanding if a specific family can find and use a provider that meets their needs, supports their children's development, and is affordable. Researchers can supplement these types of analyses of access by collecting additional data about households' needs and about child care programs and teachers. Qualitative research can also provide more insights into how families make decisions and balance multiple constraints, particularly in the face of limited options. Finally, although our analyses were limited to center-based and non-relationship-based home-based providers, a full portrait of access would also include relationship-based providers, such as family, friends, and neighbors. Supply of and demand for these types of providers may reflect family preference or be related to levels of access to other, non-relationship-based, provider types.

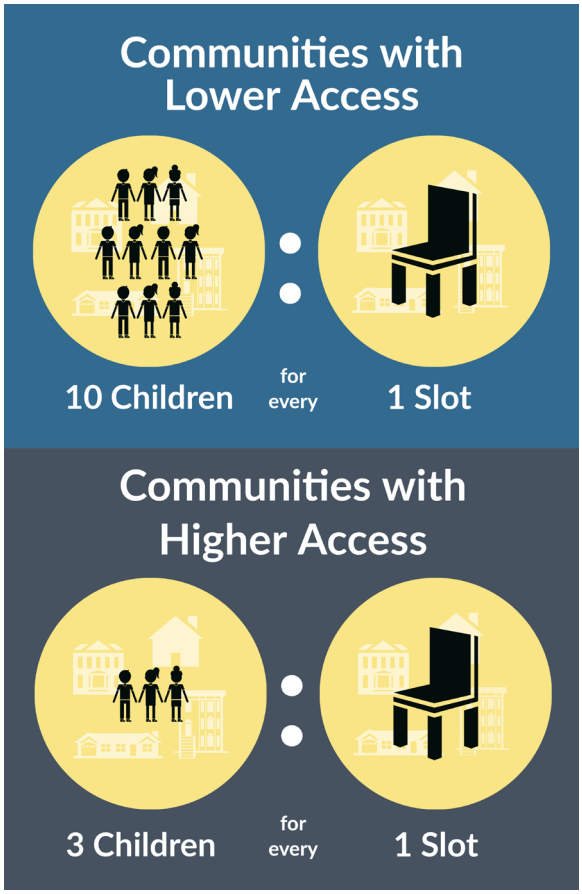
Directions for Policy

The method described in this report for estimating child care access illuminates several considerations. The first consideration is how supply and demand for child care is operationalized in different analyses of access. With this method, we considered supply and demand at a locally-defined level, but there is not one accepted definition of a local area for a child care market. Access is a local concept, requiring knowledge of local supply and demand and tailored solutions dependent on families' needs and

preferences. Second, the method used in this study illustrates a shortage in the supply of center-based and listed home-based care to meet the needs of families, particularly families with infants and toddlers. However, like many other methods for analyzing access, these shortages can be due to demand factors, supply factors, or both. It is unclear if the levels of access for families with infants and toddlers reflect lower demand for infant and toddler care or if supply is not meeting demand for families with infants and toddlers and families with low income. Finally, this research indicates that policymakers should consider other dimensions of child care that are linked to family decision making. While previous work has typically focused on increasing access to quality slots or slots that can serve children with subsidies, other aspects of affordability, meeting parents' needs, and supporting children's development need to be considered in the child care supply landscape.

Infographic to demonstrate the access ratios

The access ratios are measured in terms of the number of children for each slot. More children for every slot (a *higher* access ratio) represents *lower* access. Families who have higher access (for a dimension) live in areas with lower access ratios, that is, with fewer children for each slot.



Tables

Table 2. Summary of access ratio variables by child age

Access ratios	% of families with no providers in their area		Access ratios (tots/slot) among families with at least 1 provider in their area					
			Infants and Toddlers (0- to 2-years-old)			Preschoolers (3- to 5-years-old)		
	0- to 2-years-old	3- to 5-years-old	50th percentile (median)	25th percentile (higher-access)	75th percentile (lower-access)	50th percentile (median)	25th percentile (higher-access)	75th percentile (lower-access)
Reasonable effort								
# of children for every child care slot	0%	0%	4.3	2.9	6.4	1.6	1.2	2.7
Affordability								
# of children from families with income below 200 percent FPL for every slot priced at $2,500/year	23%	14%	130	67.3	338	70.4	23.5	191
# of children from all families for every slot priced at $2,500/year	25%	13%	235	95.5	487	107	73.5	321
# of children from families with income below 200 percent FPL for every slot priced at $5,000/year	4%	2%	49.7	18.6	108	13.5	6.7	36.3
# of children from all families for every slot priced at $5,000/year	6%	2%	65.4	28.6	173	21.2	12.0	41.9
# of children from families with income below 200 percent FPL for every slot priced at $10,000/year	0%	0%	6.1	3.0	9.7	2.9	1.7	4.4

Access ratios	% of families with no providers in their area		Access ratios (tots/slot) among families with at least 1 provider in their area					
			Infants and Toddlers (0- to 2-years-old)			Preschoolers (3- to 5-years-old)		
	0- to 2-years-old	3- to 5-years-old	50th percentile (median)	25th percentile (higher-access)	75th percentile (lower-access)	50th percentile (median)	25th percentile (higher-access)	75th percentile (lower-access)
# of children from all families for every slot priced at $10,000/year	0%	0%	9.1	5.0	15.5	4.5	3.1	6.8
# of children from families with income below 200 percent FPL for every slot that is free	0%	0%	45.0	20.1	93.1	3.8	2.1	8.2
# of children from all families for every slot that is free	0%	0%	66.6	29.6	142	6.3	3.2	12.9
Supports child's development								
# of children from all families for every slot from a provider with a degreed teacher	1%	0%	8.7	6.1	14.5	2.8	1.6	4.4
# of children from all families for every slot from a provider with a CDA/ certified teacher	0%	0%	6.9	4.7	10.8	2.2	1.5	3.7
Meets parents' needs								
# of children from families who work nonstandard hours for every slot from that offered nonstandard hours care	2%	1%	9.9	4.4	18.0	13.4	7.5	29.0

Note: To reduce disclosure risk, values ≥ 100 are rounded to the nearest integer.

Table 3. Median access ratios by family race/ethnicity and child age group

Median tots per slot	All	White	Black	Hispanic	Combined Other Race Category	Significant differences
Overall Availability						
Infants and Toddlers	4.3	4.0	4.1	5.0	4.6	Hispanic > White, Black
Preschoolers	1.6	1.6	1.7	1.7	1.6	None
Affordability: $5,000/year						
Infants and Toddlers	65.4	65.4	63.9	62.9	81.5	Other > Hispanic
Preschoolers	21.2	20.7	21.6	23.1	21.1	None
Affordability: $10,000/year						
Infants and Toddlers	9.0	6.9	8.3	11.6	11.2	Other, Hispanic > White, Black
Preschoolers	4.5	4.3	4.2	4.6	4.6	Hispanic > Black
Affordability: Free care						
Infants and Toddlers	66.6	71.9	66.6	58.3	72.7	None
Preschoolers	6.3	6.7	6.3	4.8	6.0	White > Hispanic
Support development: Degreed teacher						
Infants and Toddlers	8.7	8.9	7.8	9.3	8.9	Hispanic, White > Black
Preschoolers	2.8	2.7	2.9	2.8	2.6	None
Support development: CDA/ State certified teacher						
Infants and Toddlers	6.9	6.7	6.3	6.9	6.9	None
Preschoolers	2.2	2.2	2.2	2.2	2.1	None
Meets parents' needs: Nonstandard hours						
Infants and Toddlers	9.4	8.4	10.9	11.0	8.4	Hispanic > White, Other; Black > White
Preschoolers	13.4	13.9	13.9	11.0	10.3	White > Other

Notes: "Combined Other" category includes the following self-identified categories: Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, Other, and Multi-racial due to small samples sizes. Significant differences reported where $p < .01$ to avoid risk of inflated Type I error due to multiple comparisons. Differences in medians across groups were tested using quantile regressions.

Table 4. Median access ratios by family income and child age group

	Families with income above 200 percent FPL	Families with income below 200 percent FPL	Significant differences
Overall Availability			
Infants and Toddlers	4.2	4.4	None
Preschoolers	1.7	1.6	None
Affordability: $5,000/year			
Infants and Toddlers	68.5	62.9	None
Preschoolers	21.4	21.2	None
Affordability: $10,000/year			
Infants and Toddlers	10.0	8.3	Non-low > Low
Preschoolers	4.6	4.5	None
Affordability: Free care			
Infants and Toddlers	71.7	64.3	None
Preschoolers	6.5	5.1	Non-low > Low
Support development: Degreed teacher			
Infants and Toddlers	8.7	8.6	None
Preschoolers	2.8	2.8	None
Support development: CDA/State certified teacher			
Infants and Toddlers	6.9	6.9	None
Preschoolers	2.2	2.2	None
Meets parents' needs: Nonstandard hours			
Infants and Toddlers	9.4	9.8	None
Preschoolers	13.6	12.7	None

Note: Significant differences reported where $p < .01$ to avoid risk of inflated Type I error due to multiple comparisons. Differences in medians across groups were tested using quantile regressions.

Table 5. Median access ratios by type of primary care used among children in each age group

	Center	Home-based paid, no prior relationship	Family, Friend, and Neighbor Care (FFN)	Parent only	Significant differences
Overall Availability					
Infants and Toddlers	3.6	4.4	4.4	4.5	Parent, FFN > Center
Preschoolers	1.6	1.4	1.6	1.5	None
Affordability: $5,000/year					
Infants and Toddlers	81.5	62.9	65.1	63.7	None
Preschoolers	21.6	14.8	19.9	21.9	None
Affordability: $10,000/year					
Infants and Toddlers	7.7	10.9	9.6	9.6	None
Preschoolers	4.6	3.6	4.6	4.7	None
Affordability: Free care					
Infants and Toddlers	66.6	84.9	63.8	90.0	None
Preschoolers	6.6	5.8	5.9	7.8	None
Support development: Degreed teacher					
Infants and Toddlers	7.9	8.7	8.7	8.5	None
Preschoolers	2.7	2.0	2.6	3.2	None
Support development: CDA/State certified teacher					
Infants and Toddlers	6.1	6.9	6.9	6.9	None
Preschoolers	2.2	1.9	2.1	2.1	None
Meets parents' needs: Nonstandard hours					
Infants and Toddlers	9.8	7.8	9.8	9.8	None
Preschoolers	14.5	13.6	12.5	10.9	None

Notes: Family, friend, and neighbor (FFN) care includes paid and unpaid care from a home-based ECE provider with whom the family had a prior relationship. Significant differences reported where $p < .01$ to avoid risk of inflated Type I error due to multiple comparisons. Differences in medians across groups were tested using quantile regressions.

Table 6. Type of primary care used among families with infants and toddlers and by lower- and higher-access areas

Percentage who used each type of care	All families with infants and toddlers	Families in lower-access areas	Families in higher-access areas	Significant differences
Overall availability				
Centers	13.9%	10.6%	14.8%	None
Home-based paid, no prior relationship	8.1%	8.6%	8.8%	None
FFN	25.7%	25.1%	26.0%	None
Parent only	40.0%	45.2%	37.5%	None
Affordability: Price ≤ $5,000/year				
Centers	13.9%	15.7%	11.0%	None
Home-based paid, no prior relationship	8.1%	6.3%	9.2%	None
FFN	25.7%	26.2%	27.3%	None
Parent only	40.0%	40.7%	40.8%	
Affordability: Price ≤ $10,000/year				
Centers	13.9%	12.1%	12.1%	None
Home-based paid, no prior relationship	8.1%	7.5%	7.3%	None
FFN	25.7%	26.1%	24.2%	None
Parent only	40.0%	44.1%	40.7%	None
Affordability: Free care				
Centers	13.9%	14.6%	10.4%	None
Home-based paid, no prior relationship	8.1%	8.8%	8.4%	None
FFN	25.7%	24.3%	26.9%	None
Parent only	40.0%	39.2%	44.0%	None
Support development: Degreed teacher				
Centers	13.9%	11.6%	20.2%	Higher > Lower
Home-based paid, no prior relationship	8.1%	7.6%	8.0%	None
FFN	25.7%	26.1%	23.1%	None
Parent only	40.0%	43.4%	36.3%	None

Percentage who used each type of care	All families with infants and toddlers	Families in lower-access areas	Families in higher-access areas	Significant differences
Support development: CDA/State certified teacher				
Centers	13.9%	9.2%	15.0%	Higher > Lower
Home-based paid, no prior relationship	8.1%	8.3%	9.1%	None
FFN	25.7%	27.3%	25.5%	None
Parent only	40.0%	44.6%	36.8%	None
Meets parents' needs: Nonstandard hours				
Centers	13.9%	13.9%	12.9%	None
Home-based paid, no prior relationship	8.1%	6.9%	7.2%	None
FFN	25.7%	26.7%	25.6%	None
Parent only	40.0%	42.9%	42.2%	None

Notes: Family, friend, and neighbor (FFN) care includes paid and unpaid care from a home-based ECE provider with whom the family had a prior relationship. Significant differences reported where $p < .01$ to avoid risk of inflated Type I error due to multiple comparisons.

Table 7. Type of primary care used among families with preschoolers and by lower- and higher-access areas

Percentage who used each type of care	All families with preschoolers	Families in lower-access areas	Families in higher-access areas	Significant differences
Overall availability				
Centers	39.1%	36.8%	36.5%	None
Home-based paid, no prior relationship	6.6%	6.7%	9.3%	None
FFN	20.1%	19.0%	22.6%	None
Parent only	23.7%	25.1%	22.8%	None
Affordability: Price ≤ $5,000/year				
Centers	39.1%	39.9%	38.1%	None
Home-based paid, no prior relationship	6.6%	5.4%	8.6%	None
FFN	20.1%	15.8%	20.7%	None
Parent only	23.7%	27.1%	23.5%	None
Affordability: Price ≤ $10,000/year				
Centers	39.1%	40.3%	37.5%	None
Home-based paid, no prior relationship	6.6%	6.1%	8.3%	None
FFN	20.1%	18.6%	21.4%	None
Parent only	23.7%	23.4%	26.1%	None
Affordability: Free care				
Centers	39.1%	41.9%	34.3%	None
Home-based paid, no prior relationship	6.6%	6.2%	6.7%	None
FFN	20.1%	19.2%	23.4%	None
Parent only	23.7%	21.6%	26.6%	None
Support development: Degreed teacher				
Centers	39.1%	37.9%	35.5%	None
Home-based paid, no prior relationship	6.6%	6.5%	10.7%	None
FFN	20.1%	20.1%	21.7%	None
Parent only	23.7%	23.5%	24.2%	None

Percentage who used each type of care	All families with preschoolers	Families in lower-access areas	Families in higher-access areas	Significant differences
Support development: CDA/State certified teacher				
Centers	39.1%	35.5%	38.4%	None
Home-based paid, no prior relationship	6.6%	6.9%	7.3%	None
FFN	20.1%	19.9%	20.5%	None
Parent only	23.7%	24.9%	25.7%	None
Meets parents' needs: Nonstandard hours				
Centers	39.1%	43.8%	36.2%	None
Home-based paid, no prior relationship	6.6%	6.9%	7.0%	None
FFN	20.1%	16.5%	21.1%	None
Parent only	23.7%	23.0%	27.2%	None

Notes: Family, friend, and neighbor (FFN) care includes paid and unpaid care from a home-based ECE provider with whom the family had a prior relationship. Significant differences reported where $p < .01$ to avoid risk of inflated Type I error due to multiple comparisons.

Appendix A: Using the percentiles of the access ratios to identify "lower-" and "higher-" access areas

The median access ratios by themselves provide only part of the picture of access across places and for different types of families. Half of all families had lower access than the median value, and half had higher access. By examining the distribution of access ratios, we gathered more information about how limited access is in some areas, and if some types of families are more likely to live in areas with very limited access. Rather than setting a single threshold for low access, the 75th percentile of each access measure was used to identify families who live in areas of lower access. Families in "lower-access" areas were families in the top 25 percent of the distribution on a particular access ratio, and families in "higher-access" areas were families in the bottom 25 percent of the distribution on a particular access ratio. Families in areas with "lower" access live in areas with more children (with particular characteristics) for every slot (with particular characteristics) while those with "higher" access live in areas with fewer children for every slot in the area.

Although previous work on child care deserts has used a threshold of three or more children per slot to define "deserts" or areas with low access to ECE, we instead use relative thresholds based on the distributions of the access ratios. This approach allowed us to describe the wide range of the access ratios across dimensions instead of using a fixed threshold. We report the percentage of families of different income or demographic groups living in areas with lower access to assess disparities in access across the dimensions. The enormous variation in access ratios across locations means families face very different levels of access. Even though only a few of the differences between groups were statistically significant at the 1% level, the ranges of the access variables demonstrated the wide disparities in access experienced by families.

Families were not evenly distributed across areas with higher and lower access. More families lived in lower-access areas than lived in higher-access areas. As shown in Table A-1, one third of families with infants and toddlers lived in lower- access areas, which were areas where the number of children per slots exceeded 6.4 (which was the 75th percentile value of the overall access ratio). Hispanic families, and those in the Combined "Other" category were significantly more likely than Black families to live in lower-access areas. In addition, a higher proportion of White families (more than one-quarter) lived in higher-access areas compared to families from all other race and ethnicity groups. About half of White families with infants and toddlers lived in areas with lower access to free care, which was greater than the proportion of Black and Hispanic families (38.4% and 30.6%, respectively). In addition, while nearly 23 percent of Hispanic families lived in areas with higher access to free care, only 13 percent of Black families lived in these higher-access areas.

There were few significant differences in the proportions of families in higher- and lower-access areas between families by family income (Table A-2). No differences by income group were observed for **overall availability** or access to **care priced at $5,000/year** or less. However, with regard to **free care for preschoolers**, a larger proportion of families with income above 200 percent FPL lived in lower-access areas (37% versus 30.5%), and a greater proportion of families with income below 200 percent FPL lived in higher-access areas (27.2% versus 19.4%). Because free, formal care settings target lower-income families, these results suggest that families with lower incomes lived in areas with more free care than did families with higher incomes.

Table A1. Percentage of families in higher- and lower-access areas by family race/ethnicity

	All	White	Black	Combined Other Race Category	Hispanic	Significant differences
Overall Availability						
Infants and Toddlers						
% in lower-access areas	33.0%	31.1%	26.5%	38.0%	36.6%	Other, Hispanic > Black
% in higher-access areas	20.2%	19.9%	23.7%	19.6%	20.0%	None
Preschoolers						
% in lower-access areas	31.9%	33.4%	35.7%	32.3%	25.6%	None
% in higher-access areas	21.8%	22.6%	21.1%	23.6%	18.2%	None
Affordability: $5,000/year						
Infants and Toddlers						
% in lower-access areas	36.0%	36.3%	36.0%	42.1%	28.6%	Other > Hispanic
% in higher-access areas	21.3%	23.5%	20.1%	17.6%	20.2%	None
Preschoolers						
% in lower-access areas	31.8%	33.7%	32.1%	29.5%	28.9%	None
% in higher-access areas	22.3%	24.3%	22.4%	20.4%	17.4%	None
Affordability: $10,000/year						
Infants and Toddlers						
% in lower-access areas	31.6%	28.0%	31.7%	37.8%	33.9%	Other > White
% in higher-access areas	22.3%	26.7%	15.9%	18.8%	18.3%	White > Black, Other, Hispanic
Preschoolers						
Median tots/slot	4.5	4.3	4.2	4.6	4.6	Hispanic > Black
% in lower-access areas	31.6%	34.9%	27.5%	30.6%	26.7%	None
% in higher-access areas	21.5%	25.5%	23.2%	20.4%	10.2%	White, Black, Other > Hispanic
Affordability: Free care						
Infants and Toddlers						
% in lower-access areas	44.4%	50.9%	38.4%	44.3%	30.6%	White > Black, Hispanic; Other > Hispanic
% in higher-access areas	17.6%	16.2%	13.3%	19.0%	22.9%	Hispanic > Black

	All	White	Black	Combined Other Race Category	Hispanic	Significant differences
Preschoolers						
% in lower-access areas	35.1%	38.0%	42.4%	37.6%	21.1%	White, Black, Other > Hispanic
% in higher-access areas	21.6%	17.9%	21.2%	24.3%	29.0%	Hispanic > White
Support development: Degreed teacher						
Infants and Toddlers						
% in lower-access areas	32.9%	33.0%	30.3%	33.9%	32.7%	None
% in higher-access areas	21.1%	20.7%	25.7%	21.6%	19.6%	None
Preschoolers						
% in lower-access areas	32.1%	32.7%	36.2%	29.9%	29.9%	None
% in higher-access areas	23.7%	21.4%	24.4%	25.1%	27.6%	None
Support development: CDA/ State certified teacher						
Infants and Toddlers						
% in lower-access areas	33.5%	31.3%	30.7%	37.5%	34.3%	None
% in higher-access areas	20.6%	21.1%	24.6%	19.0%	19.2%	None
Preschoolers						
% in lower-access areas	31.5%	32.3%	32.2%	32.8%	28.1%	None
% in higher-access areas	22.8%	19.1%	22.1%	25.4%	30.3%	Hispanic > White
Meets parents' needs: Nonstandard hours						
Infants and Toddlers						
% in lower-access areas	32.0%	31.6%	36.0%	31.5%	31.8%	None
% in higher-access areas	22.2%	20.5%	21.0%	25.4%	24.3%	None
Preschoolers						
% in lower-access areas	33.0%	36.5%	38.3%	29.9%	22.3%	White, Black > Hispanic
% in higher-access areas	2%	20.2%	21.0%	28.3%	21.8%	None

Notes: Other includes the following self-identified categories: Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, Other, and Multi-racial due to small samples sizes. Significant differences reported where $p < .01$ to avoid risk of inflated Type I error due to multiple comparisons.

Table A2. Percentage of families in higher- and lower-access areas by family income group

	Families with income above 200 percent FPL	Families with income below 200 percent FPL	Significant differences
Overall Availability			
Infants and Toddlers			
% in lower-access areas	32.9%	33.1%	None
% in higher-access areas	21.9%	19.4%	None
Preschoolers			
% in lower-access areas	32.5%	30.6%	None
% in higher-access areas	20.8%	24.2%	None
Affordability: $5,000/year			
Infants and Toddlers			
% in lower-access areas	37.5%	32.8%	None
% in higher-access areas	20.7%	22.6%	None
Preschoolers			
% in lower-access areas	33.1%	28.5%	None
% in higher-access areas	21.6%	23.8%	None
Affordability: $10,000/year			
Infants and Toddlers			
% in lower-access areas	32.5%	29.6%	None
% in higher-access areas	22.2%	22.5%	None
Preschoolers			
% in lower-access areas	34.0%	25.5%	Non-low > Low
% in higher-access areas	21.2%	22.2%	None
Affordability: Free care			
Infants and Toddlers			
% in lower-access areas	47.2%	38.6%	Non-low > Low
% in higher-access areas	17.7%	17.4%	None
Preschoolers			
% in lower-access areas	37.0%	30.5%	Non-low > Low
% in higher-access areas	19.4%	27.2%	Low > Non-low
Support development: Degreed teacher			
Infants and Toddlers			
% in lower-access areas	32.2%	34.6%	None
% in higher-access areas	21.1%	21.1%	None
Preschoolers			
% in lower-access areas	31.8%	32.9%	None
% in higher-access areas	22.0%	28.1%	None

	Families with income above 200 percent FPL	Families with income below 200 percent FPL	Significant differences
Support development: CDA/ State certified teacher			
Infants and Toddlers			
% in lower-access areas	32.9%	33.3%	None
% in higher-access areas	20.6%	20.7%	None
Preschoolers			
% in lower-access areas	32.2%	30.0%	None
% in higher-access areas	21.5%	26.0%	None
Meets parents' needs: Nonstandard hours			
Infants and Toddlers			
% in lower-access areas	31.7%	32.9%	None
% in higher-access areas	20.8%	25.0%	None
Preschoolers			
% in lower-access areas	33.3%	32.1%	None
% in higher-access areas	21.8%	22.3%	None

Note: Significant differences reported where $p < .01$ to avoid risk of inflated Type I error due to multiple comparisons.

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