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Conceptualizing and Measuring Access to Early Care and Education

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Overview

Research indicates that participation in stable, high-quality early care and education (ECE) supports a wide range of children's developmental outcomes, including their readiness for school. In addition to these benefits to children, ECE is critically important for facilitating parents' and caregivers' participation in the workforce, job stability, and long-term economic security. Recent federal, state, and local policies and initiatives have thus focused on increasing access to high-quality ECE for all families. These efforts rely on access metrics to demonstrate need and to track progress over time. Because of the prevalence and potential importance of these initiatives for families and children, it is useful for the field to assess how access to ECE is conceptualized and measured and to understand the extent to which context, purposes, and available indicators shape the assessment of access. Improving the clarity and consistency in defining and operationalizing access is a key challenge for the field: practically, in terms of developing policies and initiatives to improve ECE accessand methodologically, in terms of evaluating their effectiveness.

A recent report, *Defining and Measuring Access to High-Quality Early Care and Education (ECE): A Guidebook for Policymakers and Researchers* (*Access Guidebook*), supports movement toward more consistent definitions, analysis, and reporting on access. The report offers a family-centered definition of access that emphasizes the importance of considering multiple dimensions of access, including the degree to which families are able to secure ECE with reasonable effort, the affordability of ECE, if ECE meets the parents' needs, and if ECE supports the child's development. This current report builds on this work by providing findings from a review of literature that investigates and catalogues recent efforts to define and operationalize access with a focus on the extent to which current work at the state and federal levels aligns with the multidimensional definition of access proposed in the *Access Guidebook*. For example, this literature review documents the extent to which current research and policy efforts have expanded beyond indicators of the availability of ECE slots and affordability to include indicators, such as the availability of ECE information, the quality of ECE programs, the provision of services that support the child's development and the family's needs, and the removal of structural barriers to ECE for socially or economically disadvantaged or at-risk populations. A multidimensional definition of access can be further nuanced by determining if indicators of access are rooted in a system-level perspective (with a focus on the supply side, such as availability and cost) or in a family-level perspective (with a focus on demand issues, such as geographic proximity of ECE to the home and workplace). This current review documents and discusses the balance of system- and family-level perspectives in the field's efforts to define and measure access in the context of the multidimensional framework provided by the *Access Guidebook*.

Following the introduction and a description of the methodology, the report provides information in three main sections.

Section 1: Current Practices in Conceptualizing and Operationalizing ECE Access

Section 1 presents information on how access is conceptualized and operationalized in the literature for each of the four dimensions in the *Access Guidebook*. The section provides information on the proportion of articles reviewed that address each dimension and subdimensions (i.e., conceptually distinct elements of the broader dimension), along with commonly used constructs to define and measure dimensions and subdimensions. The section also introduces a fifth dimension of ECE access that emerged during this review, *equity*, and discusses various population characteristics associated with disparities in access to ECE.

Section 2: Operationalizing Multiple Dimensions of Access

Section 2 presents information on how reports combine multiple dimensions of access. Some reports present multiple dimensions of access in a sequential fashion, first reporting on one dimension, then another, without combining the different ways of measuring access into a single composite measure

or index. Other reports examine the intersection or overlap of multiple dimensions of access, including several that go a step further to create a composite measure. This section describes examples of each of these ways of combining multiple dimensions of access.

Section 3: Ongoing Challenges in Conceptualizing and Operationalizing Access

Section 3 presents information on some of the ongoing challenges to conceptualizing and operationalizing access that emerged from this review of the literature. These challenges relate to the availability of data across all dimensions of access, the lack of consistency across the field in metrics used to operationalize access, the lack of clarity in how multiple dimensions of access or multiple data sources can be combined to paint a more complete picture of access, and the need to better understand family-level factors that influence access.

Introduction

In response to evidence that participation in stable, high-quality early care and education (ECE) can improve a wide range of children's developmental outcomes and support parents' stable employment,[1] recent federal, state, and local initiatives have sought to improve access to high-quality ECE for all families. To assess the extent to which children who would benefit from ECE are able to access the care that meets their family's needs – and to monitor progress over time – state and local early education and human services agencies must define, and ultimately measure, what is meant by ECE access. Access to ECE may be defined and measured in many ways depending on the specific questions researchers or policymakers want to answer and on practical factors like research budget and available data. However, establishing a common understanding of ECE access and a set of measurable indicators is essential for identifying and tracking the results of initiatives and for making comparisons within or across different settings or geography.

Historically, policymakers and researchers have tended to examine access by focusing on a single factor, such as availability or affordability of ECE. More recently, however, policymakers and researchers have increasingly acknowledged the range and interconnectedness of factors that affect families' ability to use ECE services. Recognizing that the field lacked a single, accepted, research-driven, and practical definition of access, a panel of researchers and state policymakers proposed a multidimensional definition of ECE access in a 2017 report, *Defining and Measuring Access to High-Quality Care and Education (ECE): A Guidebook for Policymakers and Researchers (Access Guidebook)*, supported by the Office of Planning, Research, and Evaluation at the Administration for Children and Families. The working definition of access was also designed to reflect the perspective of families: **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.**[2]

The *Access Guidebook* identifies four primary dimensions of access: (1) requires no more than reasonable effort, (2) is affordable, (3) supports the child's development, and (4) meets the parents' needs. This multidimensional view of access promotes a comprehensive understanding of the factors that affect families' ability to use ECE services.

Dimensions of Access

Reasonable Effort: The first dimension of access to ECE, *reasonable effort*, posits that there must be sufficient availability of age-appropriate ECE slots near parents' homes or workplaces, and information about those ECE options must be readily available.

Affordability: The second dimension of access, *affordability*, reflects a broad definition of cost, including cost to parents, subsidies or financial assistance, and costs incurred by ECE programs for providing services.

Supporting Children's Development: The third dimension of access to ECE states that for families to have full access, the ECE should *support the child's development*, (i.e., be high quality and meet children's developmental needs).

Meeting Parents' Needs: The fourth dimension of access to ECE states that families should be able to obtain care that *meets the parents' needs* across a variety of factors, including parental preferences for specific program types or features or the need for extended care, care during non-traditional hours, or care for multiple children.

Equity: The fifth, newly added dimension of access to ECE highlights disparities in availability, affordability, quality, and other characteristics of ECE and can be defined as the ability to *reach underserved or disadvantaged children*.

With the working definition of access in mind, and knowing the centrality of access in current policy discussions, the purpose of this report is to encourage dialogue and planning for new approaches to measurement that can better document and improve access. This report crosswalks recent definitions and indicators of access in the literature published in the past five years at local, state, and national levels with the multidimensional definition as presented in the *Access Guidebook*. Specifically, the authors of this report examine the extent to which current definitions and indicators reflect a multidimensional view of access, the number and type of dimensions included, if and how the dimensions were combined, and any challenges related to the conceptualization or operationalization of access. In addition, the extent to which current indicators of access consider families' perspectives was noted.

Considering how access was measured in the field prior to and overlapping with the new *Access Guidebook* definition, this report aims to (1) assess where the ECE field is in developing common language and metrics for discussing, documenting, and ultimately improving ECE access; and (2) share how researchers have measured the various dimensions of access proposed in the *Access Guidebook* using specific indicators. Policymakers face difficult decisions about how to strategically invest public funding to promote equitable access; developing a common language and metrics for access will provide critical support to inform those decisions.

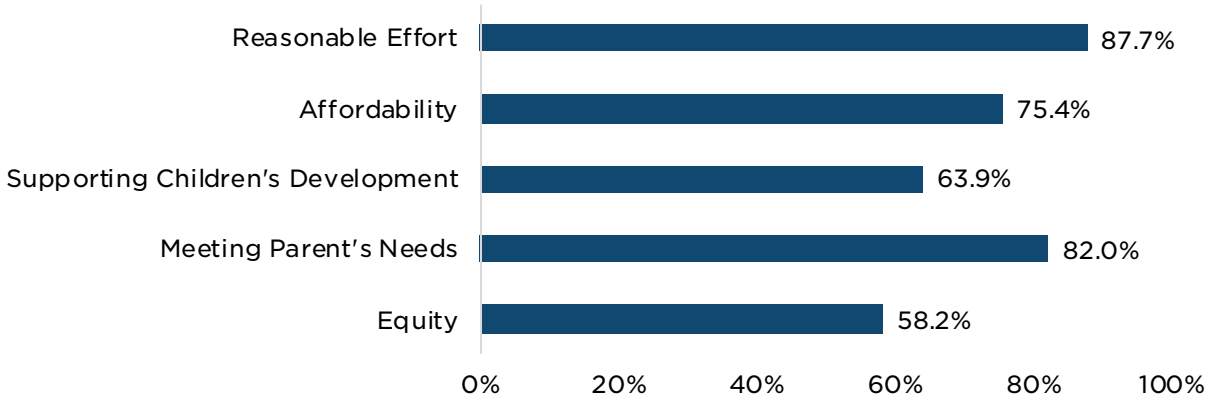
Key findings from this report include:

- While availability and use of ECE services continue to be the foundation for most definitions and indicators of access, more than 88 percent of the reports and articles reviewed explicitly define and measure access in ways that span multiple dimensions.
- More than half of the reports and articles also address issues of equity, which emerged in the process of this review as a fifth dimension of access. Articles that addressed equity highlighted

the capacity of ECE to reach and engage underserved, disadvantaged, high-risk, or vulnerable populations.

- Most articles and reports present findings related to multiple dimensions of access, but few researchers combine indicators across dimensions in a way that provides an overall score or characterization that takes these multiple dimensions into account.
- Despite efforts to address multiple dimensions of ECE access, current research rarely applies both a systems perspective (that takes into account factors and constraints on the supply side, such as availability and cost) and a family perspective (that takes into account demand-side factors related to characteristics of families) to understanding and measuring access.
- The scarcity of research that combines a systems perspective and a family perspective may be due, in part, to lack of data on a range of family-centered indicators.

Figure 1. Percentage of Articles that Address Each Dimension of Access



Approach

This report distinguishes between *conceptualizing* and *operationalizing* access. *Conceptualizing* access means specifying what is meant by the term access, identifying the key constructs of access and how they are related to each other, while *operationalizing* access means developing concrete ways to measure the key components of access. Describing how states, researchers, and policymakers conceptualize access is important for developing a common understanding and framework for discussing and promoting ECE access. Conceptualizing access provides the foundation for both operationalizing and ultimately measuring access. Understanding how states, researchers, and policymakers *operationalize* access supports necessary transparency in research so that scientific advances can be made. It is also important for developing common metrics for quantifying access, or one of its key dimensions, to allow for comparisons across contexts or to measure progress over time. While in many cases a study's conceptualization and operationalization of access are aligned, in some instances, a study's definition of access might be broader than how it is measured due, for example, to data limitations. In short, the primary goal of this report is to clarify how ECE access is currently defined and how it is currently measured.

The four dimensions of access established in the *Access Guidebook*, and a fifth dimension, *equity*, that emerged from this review, were used as an *a priori* framework for categorizing current practices of conceptualizing and operationalizing access. As noted, these dimensions are helpful as guideposts for considering the extent to which current conceptualizations and approaches to measurement reflect a multidimensional view of access, However, while these dimensions represent key constructs of ECE access, they are not intended to be mutually exclusive or exhaustive categories under which each

measure of access used in the literature clearly falls. Rather, some indicators of access could be explored in different ways and categorized under multiple dimensions. Nonetheless, a goal of this report is to provide examples of indicators from the literature that seem, in theory, to fall within a given dimension. By doing this, the authors of this report examine the extent to which current efforts to measure access include multiple dimensions, and how multiple dimensions are combined to provide a richer, more complex picture of ECE access.

Another approach to understanding the evolution of how the field conceptualizes and operationalizes access that emerged in this review of the literature is the interplay between using a systems perspective and family perspective. Traditionally, access has been predominantly examined from a *systems perspective*; that is, access has been perceived as *an attribute of services, determined by factors and constraints on the supply side, such as availability and cost*. This makes sense given that such system-level factors are amenable to change in the face of targeted policies aimed to improve access. However, access is increasingly viewed from a *family perspective*, with indicators of access also incorporating *demand-side factors related to characteristics of families*. For example, it is not simply the location of an ECE provider that will have an impact on access, but also a family's capacity to travel to those services. As the research team reviewed the literature, they also examined whether indicators of access were measured from a systems or family perspective to better understand how current ways of operationalizing access incorporate an approach that reflects the perspectives, priorities, and needs of families.

Key Terms

Conceptualization: The process of identifying the key constructs that make up the concept of "access" and how they are related to each other.

Operationalization: The process of defining variables into measurable indicators of access.

System-level data: The level of analysis that takes place on a system-wide level, such as data that are collected by local, state, or national agencies or departments about attributes of the programs, providers, or populations within its jurisdiction.

Family-level data: The level of analysis that takes place on a family unit level, such as information collected about individual families that reflects family beliefs and attitudes, characteristics of family decision making, and perceived barriers to accessing child care.

Family-centered perspective: Intentionally using data to examine issues related to families' needs through the family's point of view. In many cases, family-level data analysis allows researchers to incorporate a family-centered perspective into their research. However, in some cases, the most readily available and reliable data are typically collected using system-level indicators (e.g., providers' hours of operation), and that information can still be evaluated in part through the lens of families' needs (e.g., the need of some families for care during non-traditional hours).

Systems perspective: Using data, usually collected at a system level, to examine access in relation to the availability and provision of services and thus determined by factors and constraints on the supply side, such as availability and cost.

Together, these approaches provide a lens through which researchers can assess the state of the field in light of the multidimensional, family-centered definition of ECE access proposed by the *Access Guidebook*. This report is not intended to be a systematic or exhaustive review of findings on access given the difficulty of comparing findings across different indicators or ways of measuring different constructs within access. Instead, this report is intended to provide researchers and policymakers with examples of indicators and ways they can be combined to create a more nuanced view of access that includes the perspectives of families.

Methodology and Data

This report synthesizes state and federal reports and U.S.-based research published in peer-reviewed journals during the past five years (2013-2018) that conceptualize and/or define access or a key dimension of access. This timeframe was intended to capture research efforts that occurred in the wake of federal policy changes, such as the Race to the Top Early Learning Challenge (2011-2013) and the reauthorization of the Child Care and Development Block Grant (2014) that required states to demonstrate and document efforts to improve access to high-quality ECE. As a first step in the process, the research team gathered relevant materials for this report by conducting database searches using strategic search terms. Google, Child Care and Early Education Research Connections,

Psych Info, ERIC, and Google Scholar were searched for papers or reports based on the following key words and phrases: ECE access, affordable ECE, ECE supply, ECE demand, child care desert, barriers to ECE, inequalities in ECE, inequities in ECE, and disparities in ECE. The key phrases were also repeated substituting each of the following terms for ECE: early care and education, early childhood education, child care, early care, day care, preschool, and pre-K. Finally, to ensure that the search produced results that address the needs and challenges specific to conceptualizing and measuring access to ECE for underserved or at-risk populations, all searches were repeated with the addition of each of the following special population terms: low-income, working families, immigrant families, child welfare, disabilities, homeless/homelessness, tribal and American Indian/Alaskan Native. Searches were conducted with each set of search terms on their own and in conjunction with the names of each state and territory separately. In addition, the research team followed up on leads of relevant work suggested by the ECE Access and Choices work group and experts in the field. All search results were screened and determined to be relevant if the report or article provided a definition of access and description of how access was being measured.

A total of 124 articles and reports were catalogued. Approximately 60 percent of the sources identified were reports or briefs, and 35 percent were peer-reviewed journal articles. Approximately 60 percent of the reports and articles analyzed data at the state or local level, and 34 percent analyzed data across multiple states or at the national level.

As a next step, the research team catalogued the relevant results of the literature search. Each report or article was reviewed and logged in an Excel spreadsheet that recorded the following information: report/article type (federal/state/local report or brief versus peer-reviewed journal article); how access was conceptualized or defined; how access was measured or operationalized; the extent to which the operationalization of access aligns with each of the dimensions and subdimensions of access proposed in the *Access Guidebook,* or additional dimensions or subdimensions that emerged in the course of this review; the primary policy-relevant research questions (or purpose of report); sample; the data source(s) used and/or data challenges; and additional notes. The reports and articles were coded at both the dimension and subdimension levels. The research team then analyzed key themes and patterns to discern an overall portrait of how access is currently being conceptualized and operationalized in the context of current research and federal and state efforts to improve ECE access. Specifically, the team examined the extent to which current conceptualizations and indicators reflect a multidimensional view of access, the number and type of dimensions included, if and how the dimensions were combined, and any challenges related to the conceptualization or operationalization of access.

Current Practices in Conceptualizing and Operationalizing ECE Access

As noted, the conceptualization of access, which involves identifying the key constructs of access and how they are related to each other, provides a framework and foundation for developing concrete indicators that can be used to quantify those constructs. A study's conceptualization, or definition, of access is often aligned with how it ultimately operationalizes access. However, this is not always the case. In some instances, a study's definition of access is broader than how it is measured. For example, a report might acknowledge in their definition of access that quality is a key dimension of access but not include it in their operationalization of access because measures of quality are either unavailable or unreliable.

The following sections describe current practices found in the access literature for each of the four dimensions from the Access Guidebook. We divided each dimension into subdimensions, based on

ideas presented in the Access Guidebook that appeared in the literature we reviewed. For example, the dimension of "reasonable effort" is divided into four subdimensions: 1) availability (includes supply, demand, and utilization, 2) geographic location, 3) ages of children served, and 4) availability of information to parents about ECE options. Each subdimension includes conceptually distinct constructs of "reasonable effort" that are measured using a variety of indicators. We call attention to those dimensions and subdimensions that appear heavily represented in the existing literature (e.g., availability and affordability), as well as those that may not appear often, despite widespread support of their importance (e.g., availability of information to parents about ECE options). For the fifth dimension emerging from thisreview, equity, we present examples of socioeconomic, racial/ethnic, demographic, and other categories that represent families who may be vulnerable to difficulty accessing ECE. It is important to note, however, that the constructs within each subdimension may be combined and measured in ways that tap into more than one dimension of access. The way in which multiple constructs across dimensions have been combined will be described later in the report.

Key Terms

Indicator: Specific observable and measureable variables that have been defined and studied within the literature as ways of pointing to and defining their respective constructs.

Construct: Conceptually distinct characteristics that have been operationalized and studied within the literature using indicator variables.

Consideration: Specific non-indicator findings from the literature that may provide additional context for its respective construct. New research should be viewed in context of considerations.

Measure: A specific variable, tool, or *way of measuring* a given indicator.

A Guide to the Tables

The tables for the first four dimensions are organized by subdimension and compile information into four columns: 1) commonly used constructs within the subdimension, 2) the indicators used to define and measure those constructs, 3) the level of data collection (system-level or family-level data) used in the representative articles and reports, and 4) any additional considerations. Under considerations, we often cite work that examined a particular construct with qualitative data and so was not included as an indicator as defined in this report; however, the information gathered from families in focus groups or interviews is essential for defining indicators and creating meaningful measures. In the indicators column, the percentages of articles that address each dimension or subdimension are not intended to be precise but are intended to provide a general overview of the degree to which constructs are represented in the literature relative to other constructs. We cite 2-3 example studies per construct mentioned, which is by no means an exhaustive list. Often, our review revealed dozens of studies.

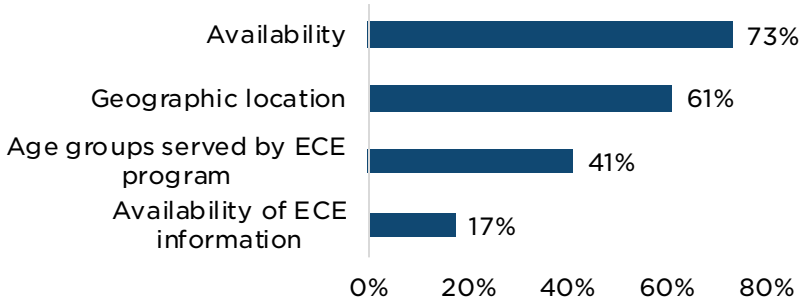
Access Dimension I: Reasonable Effort

The *Access Guidebook* states that for parents to be able to enroll their children in ECE with no more than "reasonable effort," there must be sufficient *availability of age-appropriate ECE slots* near parents' homes or workplaces, and *information about those ECE options must be readily available.*[3] Only one state- or local-level article in our review explicitly features the concept of "reasonable effort," which it cites from the *Access Guidebook.*[4] This is not surprising since the review covered literature published between 2013–2018, and the *Access Guidebook* was not published until 2017.

Subdimensions of "Reasonable Effort"

- **Availability** (supply, demand, and utilization)
- **Geographic location**
- **Ages of children served**
- **Availability of information about ECE options**

Figure 2. Percentage of Articles that Address Each Subdimension of "Reasonable Effort"



Although most articles do not explicitly name the concept of "reasonable effort," the vast majority (88%) address at least one of its *subdimensions*, which include *availability, geographic location, ages of children served,* and *availability of information about ECE options*. That such a large proportion of the literature we reviewed examined access by measuring availability in these ways is indicative of where the field has historically concentrated its conceptualizing and operationalizing of access.

Most sources (73%) address *availability*, the first *subdimension* of "reasonable effort," by measuring supply (e.g., the number of available slots), demand (e.g., the number of children who would potentially fill a slot), and/or utilization (the use of ECE by families). Of primary interest is the *lack* of availability of ECE, which is often measured as the gap between supply and demand, representing an "unmet need." We also include utilization under *availability* because it more fully captures the way families access care, rather than pure enrollment numbers. Although enrollment helps capture aspects of access beyond pure supply and demand, it does not provide a complete picture. Some families have full access to ECE but choose not to enroll their children because they prefer parental care.[5] In other cases, families may have enrolled their children in the only ECE arrangement they could get even if that arrangement is not truly affordable for them, is not high quality, or requires them to make major changes, like finding employment with different hours. Although these families have managed to enroll their children in ECE, they may not truly have access according to the *Access Guidebook's* definition 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." Many reports also address *availability* by breaking down supply and demand by specific characteristics, such as quality,[6,7] program type,[8,9] or ages served.[10,11] Others examine the equity of *availability* by comparing supply and demand across areas with different racial/ethnic compositions and concentrations of poverty.[12,13,14] Such combinations of indicators across dimensions are discussed later in the report; in this section, we focus on how *availability* itself is measured.

Geographic location, another subdimension of "reasonable effort," appears in 61 percent of articles. It is often addressed in combination with *availability*—for example, supply compared to demand in a certain geographic region. Most indicators related to *geographic location* focus on a set geographic unit, such as a census tract, county, or metro region. Some sources argue, however, that such preset geographic units do not reflect the ability of any given family to reasonably travel to the available care options; instead, they examine ECE options within a geographic radius around a family's home. Also included in this subdimension is transportation, which affects the distance families can reasonably travel for ECE.

Roughly 41 percent of the sources from our search break down indicators of access by *child age*. The majority of these articles address supply by *age group*, given that supply of care tends to be much more limited for infants and toddlers. Because families must take into account the age of their child when seeking care, we categorize *age-related indicators* under "reasonable effort." However, *age indicators* also appear with indicators for other dimensions of access, such as cost of care.

The fourth subdimension of "reasonable effort," *availability of information about ECE options*, appears

in 17 percent of articles. It is typically addressed with qualitative data from parent interviews—for example, descriptions of what sources of information parents use to choose their ECE providers.

Details on constructs related to the "reasonable effort" subdimensions and their prevalence in the literature are presented in Tables 1–4. While many indicators of access span more than one subdimension—for example, measures of availability are often based on *geographic location* and/or *ages of children served*—these tables are separated by subdimension for conceptual clarity.

Table 1. Indicators of "Reasonable Effort": Availability

Construct	Indicator	Family- or System- Level	Considerations
Supply of child care slots	• Number of licensed child care slots is one of the most common indicators of supply.[15,16,17] • A few examined programs' desired capacity – the ideal number of slots a program aims to fill – which may be a more accurate measure of actual supply.[18,19,20] • Two reports examine the supply of unlicensed ECE.[21]	• System	• Some articles state that they focus on licensed care because it is likely to be higher quality than unlicensed care,[22] but generally the focus on licensed care seems to be due to data availability. • Some studies that examine the supply of unlicensed ECE identify unlicensed providers through the National Establishment Time Series (NETS) database, Info USA, and local sources.[23]
Supply of ECE workforce members	• One report creates a standardized score for ECE availability in each state based on the ratio of ECE workforce members to children under 5.[24] • Another report compares the number of ECE workforce members five years in the past, in the present year, and projected 10 years into the future and estimates the future shortage of child care workforce members relative to projected demand.[25]	• System	

Construct	Indicator	Family- or System- Level	Considerations
Demand for child care slots	• Many studies measure demand based on the total number of children in a given age range within a geographic unit (e.g., ZIP code, county).[26,27] • Several sources estimate demand using the number of children with all parents in the workforce, intended as an indication of children "likely to need care."[28,29,30,31,32,33] • Two reports use ECE referral requests to estimate demand.[34,35] • Occasionally, reports estimate demand based on ECE participation rates in areas with populations analogous to their own. For example, an ECE needs assessment in Grand Rapids, Michigan estimates the demand for licensed or registered ECE based on trends in similar Midwest cities.[36]	• System	
Unmet need	• Roughly 58 percent of sources from our search include indicators of supply and demand, typically calculating the gap between the two (supply minus demand) as an estimate of "unmet need."[37,38,39] • An analysis of unmet need for preschool services in California examines public preschool participation rates in a low-income area of a state with sufficient funding for all children to attend ECE, to estimate the percentage of low-income families who would enroll their children in preschool if all barriers were removed.[40]	• System	• Indicators of unmet need incorporate measures of supply and demand, and thus reflect variations similar to those seen in how supply and demand are both measured (e.g., licensed slots versus unlicensed slots, total number of children versus total number of children with both parents in the workforce).

Construct	Indicator	Family- or System- Level	Considerations
Changes in supply & demand over time	• Estimates of future demand are based on population growth and decline projections.[41,42] • One report estimates future supply based on a survey of providers about their current usage rates and their plans to expand capacity.[43] • One report projects the shortage of child care workers and preschool teachers 10 years in the future.[44]	• System	• Most analyses of supply and demand focus on a single point in time. However, a few compare changes over previous years,[45,46] and some make projections for the future.
ECE enrollment	• Several reports use ECE enrollment rates as an indicator of access.[47,48] • Most indicators of enrollment rates examine a specific point in time,[49,50] although one organization (Connecticut Voices for Children) measures "preschool experience rate," defined as the percent of kindergarteners who had ever enrolled in preschool.[51,52]	• Family	• Indicators of enrollment help account for factors beyond supply that affect families' access to ECE. Even when sufficient slots are available, some families cannot enroll their children in those slots due to barriers related to other dimensions of access ("affordability," "supporting the child's development," or "meeting parents' needs"). • One report that attempts to verify a relationship between ECE enrollment rates and other access-related variables finds no statistically significant associations. The authors attribute the lack of significant relationships to unreliable enrollment data.[53]

Table 2. Indicators of "Reasonable Effort": Geographic Location

Construct	Indicator	System- or Family Level	Considerations
Supply & demand by geographic unit	• The most common geographic units for supply and demand analyses are county[54,55] and ZIP code.[56,57] • Other geographic units include states,[58] census tracts and block groups,[59,60] neighborhoods,[61] school districts,[62] legislative districts,[63] and metro regions.[64]	• System	• Many studies produce maps with county or ZIP code access indicators.[65,66]
Supply & demand in a geographic radius	• A few studies examine supply and demand using a geographic radius recognizing that families' ECE options are not limited by ZIP codes or other pre-set boundaries. • The National Survey of Early Care and Education (NSECE) creates "household secondary sampling units" composed of a single census tract or cluster of contiguous tracts and then creates "provider clusters" for analysis using all census tracts within or intersecting a two-mile radius from the centroid of each secondary sampling unit.[67] • An assessment of access in the greater Tucson, Arizona area and a proposal for new family-centered indicators of access both include two-step floating catchment area analyses, based on similar methods in geography and healthcare literature.[68,69]	• Family	

Construct	Indicator	System- or Family Level	Considerations
Supply & demand near parents' workplaces	• Most articles compare supply and demand based on the geographic location of children's homes. However, a few reports recognize the need for ECE near parents' workplaces.[70] • Reports from the Reinvestment Fund adjust demand estimates to indicate lower demand in areas that are primarily residential and higher demand in areas that are employment destinations.[71,72,73,74] • A report on ECE in Minnesota maps licensed child care capacity alongside "job centers," defined as areas with an employment density of at least 10 jobs per net acre, and at least 1,000 jobs total.[75]	• Family/ System	
Transportation	• One article considers access to transportation with indicators such as percent of households with no available vehicle.[76] • One article uses percentage of ECE providers who offer transportation as an indicator of accessibility.[77] • A few articles analyze the supply of ECE providers near train stops or other public transportation.[78,79]	• Family/ System	• Transportation affects the distance families can reasonably travel for ECE.

Table 3. Indicators of "Reasonable Effort": Ages of Children Served

Constructs	Indicators	System- or Family Level	Considerations
Age groups served by ECE programs	• Some reports compare the supply and demand of ECE slots for each age group.[80,81,82,83] • Some examine the cost of care by age.[84,85,86,87] • The most common divisions are infant, toddler, and preschooler. Infant and toddler ages are often examined jointly, and preschool-age children are sometimes divided into two groups to examine 3 year olds and 4 year olds separately. • Though our search focused on child care for ages 0-5, we found a few reports that examine care for school-age children (up to age 12) in addition to care for the youngest children.[88,89,90]	• System	• Some reports focus on a single age group, such as only infants and toddlers or only pre-K children. • Some reports group all children ages 0-5 (not yet in kindergarten) together.

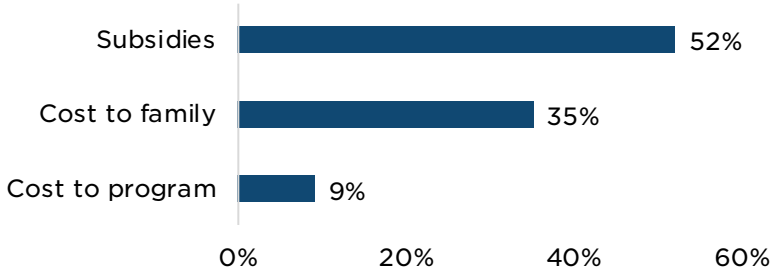
Table 4. Indicators of reasonable effort: Availability of information about ECE options

Constructs	Indicators	System- or Family Level	Considerations
Parents' experiences finding information	• We did not find any articles that quantify the availability of information about ECE programs for parents. • One report used Google Analytics and Google Trends to examine how parents use Google to search for and find care.[91] • The same report also examined parents' interactions with Parent Aware, a child care search tool used in Minnesota.[92]	• Family	• A few reports use parent interviews and focus groups to learn more about parents' experiences finding information about ECE.[93,94,95] • Data from interviews and focus groups touch on the following issues: where families obtain their information (e.g., references from family and friends, signs in their community, or online research), [96,97] how up-to-date online resources are,[98,99] to what extent cultural barriers, language barriers, and insufficient outreach to special populations limits parents' knowledge of their options,[100] and to what extent parents are aware of eligibility for free and subsidized ECE.[101,102]
Practitioners' experiences helping families learn about ECE options	• We did not find any articles that quantify the availability of information about ECE programs from a practitioner perspective.	• System	• Although most sources that address availability of information about ECE options focus on parents' perspectives, a few sources present data from interviews and focus groups with practitioners about their experiences helping families find child care.[103,104,105,106] • Data from interviews and focus groups touch on limited ability to talk with parents about child care choices due to large caseloads and limited resources,[107] as well as incomplete understanding of the child care needs of special populations, such as immigrants.[108,109]

Access Dimension II: Affordability

The *Access Guidebook i*dentifies "affordability" as a central dimension of access with subdimensions including 1) *subsidies, free care, and other financial assistance,* 2) *cost to families*, including costs as *percent of family income*, and 3) *program operating costs* (cost to programs to provide care).

Figure 3. Percentage of Articles that Address Each Subdimension of "Affordability"



Subdimensions of "Affordability"

- **Subsidies, free care, and other financial assistance**
- **Cost to families,** including costs as percent of family income
- **Program operating costs**

Approximately 75 percent of the reports in our review feature affordability as a component of access. Very few of these reports examine access solely, or even primarily, in terms of "affordability."[110,111,112] Most address access in terms of both availability and "affordability"—for example, the availability of affordable care.[113,114,115] We chose to break the "affordability" dimension into three subdimensions to group common indicators by theme. The most common theme falls under the subdimension of *subsidies, free care, and other financial assistance* with 52 percent of articles including data on families' use, provision of free care (e.g., Head Start), and/or providers' acceptance of financial support (e.g., scholarships) as indicators of "affordability." Just more than a third (35%) of the articles included data on *cost of care* for families, often broken down by child age or program type[116,117,118,119] and cost of care as a percentage of family income.[120,121,122] A small number of articles (9%) examine the *program operating costs* or the cost to programs to provide care, which is important for access since it affects programs' ability to offer care at an affordable price and maintain a stable, high-quality workforce.

Details on constructs related to the "affordability" subdimensions and their prevalence in the literature are presented in Tables 5-7.

Table 5. Indicators of "Affordability": *Subsidies, Free Care, and Other Funding Assistance*

Construct	Indicator	System- or Family Level	Considerations
Subsidy reimbursement rates	• Indicators related to reimbursement rates include the dollar amount that subsidies covered[123] and the surplus or deficit between the cost of service delivery and the cost covered by subsidies.[124]	• System	
Supply of ECE that accepts subsidies	• System-level indicators addressing supply, demand, and use of subsidies include percentage of ECE slots at various types of programs filled by children who receive subsidies,[125] share of slots in programs that accept subsidies,[126] and average proportion of centers in households' geographic proximity that serve at least one child with a subsidy.[127]	• System	

Construct	Indicator	System- or Family Level	Considerations
Demand for and use of ECE that accepts subsidies	• Family-level indicators addressing supply, demand, and use of subsidies include the number of children or families who receive subsidies[128] and percentage of eligible children or families who receive subsidies.[129] • Many reports examine unmet need for subsidized care by assessing the percentage of subsidy-eligible children who actually receive subsidies[130,131,132] or the number of children on subsidy waiting lists.[133,134]	• Family	
Availability of publicly-funded providers	• Indicators include the average proportion of providers in households' geographic proximity that serve at least one child through Head Start or public pre-K funding,[135] and the percentage of providers in a geographic region offering free care.[136]	• System	

Table 6. Indicators of "Affordability": Cost to Families, Including as Percent of Family Income

Construct	Indicator	System- or Family- Level	Considerations
Cost to families	• Reports generally examine average cost at the annual level, but some articles use weekly,[137] daily,[138] or hourly[139,140] time units, and one examines the average cumulative cost of care for a child from birth to age 5.[141] • Average cost (i.e., average rate charged by provider) is often broken down by child age[142,143,144] and program type (center-based versus home-based).[145,146,147] • One analysis of cost by program type includes the average cost of in-home ("nanny") care.[148] • One report addresses transportation costs associated with ECE options farther from families' homes by including travel costs when calculating ECE cost, for the nearest provider to a family and for a weighted average of nearby providers.[149] • Two reports measure median cost,[150] though this is far less common than average cost.	• System	• Different methods of calculating average cost may yield different results. For example, means can be calculated at the program level or at the slot level.[151] • Transportation to ECE carries costs on top of the cost of ECE itself, which may make ECE options farther from families' homes or workplaces more expensive.[152]

Construct	Indicator	System- or Family- Level	Considerations
Proportion of ECE that is "affordable"	• Common thresholds for defining if care is "affordable" is that total family contribution across children for ECE is no more than 7 percent[153] or 10 percent[154,155] of a family's income. • A few reports use survey data to compare families' ECE costs directly to the same families' incomes, but the most common indicator of "affordability" is average ECE price compared to median household income in a geographic area.[156] • Some reports compare ECE cost to income levels other than the median, such as the income of a parent working full-time at minimum wage[157] or the income of a family at a certain ratio to the federal poverty line.[158,159,160]	• System/ Family	
Cost of ECE for a family with more than one child	• Many families need ECE for more than one child. A few reports address this issue by calculating the cost of ECE for a family that has an infant and a preschool-age child.[161,162,163] • One report measures the percentage of programs that offer a discount for families that enroll multiple children.[164]	• System	
Families' experiences with cost & affordability	• A few articles use surveys, interviews, or focus groups to examine how cost and affordability affect parents' decisions about their ECE arrangements.[165,166,167] • Another article examines affordability specifically for moderate-income families whose income is above the eligibility threshold for subsidies but not high enough to comfortably afford care out of pocket.[168]	• Family	• One article uses focus group data to describe the types of compromises parents make in ECE selection due to inability to afford the care arrangements that best support their child's development and meet their family's needs.[169]

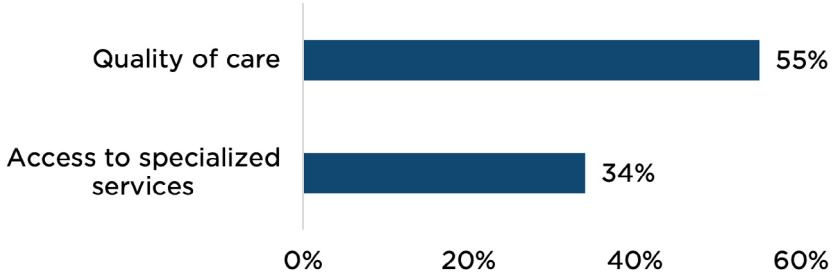
Table 7. Indicators of "Affordability": Program Operating Costs

Construct	Indicator	System- or Family- Level	Considerations
Staff and teacher salary costs	• Some indicators address staff income, such as annual median salary.[170] • One article examines the percentage of child care staff considered low-wage workers.[171]	• System	
Other operating costs	• Other indicators address revenue sources,[172] operating costs (including facility expenses, such as rent and utilities; administration costs, such as licensing, training, supplies, and accounting services; food costs; and staffing costs),[173] the cost of providing care per child,[174,175] and the gap between private cost and subsidy contributions.[176] • One report that addresses financial barriers to expanding high-quality ECE includes measures of profitability and liquidity across different star ratings, operating models, and proportions of low-income children served.[177]	• System	

Access Dimension III: Supporting Children's Development

The *Access Guidebook* states that for families to have full access to ECE, they should be able to obtain care that "supports the child's development." Sixty-four percent of the articles reviewed address at least one subdimension of supporting children's development. These subdimensions include *quality of care* and *access to specialized services* for children with particular needs (e.g., developmental disabilities, dual language learners).

Figure 4. Percentage of Articles that Address Each Subdimension of "Supporting Children's Development"



Subdimensions of "Supporting Children's Development"

- **Quality of care**
- **Access to specialized services**

Approximately 55 percent of sources in our review include *designation of quality* as a component of access that fits within the dimension of meeting children's needs. As with "affordability," quality of ECE is often packaged with *availability* such that access is defined in terms of availability of high-quality care (e.g., the availability of slots in high-quality ECE programs).[178,179] Further, many

reports combine *quality* with *availability* and "affordability" such that access is conceptualized as the availability or use of affordable, high-quality ECE.[180,181,182] Indicators of *quality* are also used as an element of child care "desert" analyses, in which a "high-quality child care desert" is defined as a ZIP code with more than three children under age 5 per high-quality ECE slot.[183]

Roughly 34 percent of sources address the *specialized services for children with disabilities* subdimension. Most of these sources examine either supply (e.g., number of providers with specialized services for children with special needs)[184,185] or demand (e.g., child disability status)[186] but do not compare the supply of slots for children with special needs to the number of children who might need that care. Additionally, just fewer than half of these sources address the extent to which families have access to ECE in languages other than English. Most of these sources focus on Spanish.[187,188]

Details on constructs related to the "supporting children's development" subdimensions and their prevalence in the literature are presented in Tables 8–9.

Table 8. Indicators of "Supporting Children's Development": *Quality of Care*

Construct	Indicator	System- or Family Level	Considerations
QRIS ratings	• Indicators assessing quality include the percentage of regulated providers who have a QRIS rating,[189,190,191] the percentage of regulated providers at each rating level,[192,193] and the percentage of children enrolled in "high quality" programs according to the QRIS ratings.[194,195,196] • Some reports break QRIS rating data down by program type (center-based versus home-based), child age, or children's receipt of subsidies.[197,198,199]	• System	• Most reports that assess quality rely on quality rating and improvement system (QRIS) ratings. • QRIS ratings are often the most comprehensive quality indicator available, but there may be high-quality providers who choose not to or are unable, due to limited funding, to participate in QRIS, so these data are not always complete.

Construct	Indicator	System- or Family Level	Considerations
Administrative and survey data	• While QRIS ratings are the most common indicator of quality, many reports use other indicators, such as accreditation by a national body,[200,201,202] caregiver educational attainment,[203,204,205] and caregiver credentials.[206] • One source uses licensing as a "proxy measure for at least minimal program quality."[207] • Some sources use national survey data (e.g., the Head Start Impact Study,[208] the NICHD Study of Early Child Care and Youth Development,[209] or the Early Childhood Longitudinal Study—Birth Cohort.[210]) that included indicators of program quality. These indicators were often based on a composite score that included information about adult-to-child ratio, group size, and caregiver education level. Sometimes they also included scores derived from observational assessments of caregiver-child interactions and classroom environments.	• System	• While several reports examine access to licensed care, most do not explicitly connect licensing to the concept of quality.
Observational data	• Occasionally, studies assess quality through classroom observations using tools such as the Classroom Assessment Scoring System (CLASS)[211] or the Early Childhood Environment Rating Scale (ECERS).	• System	

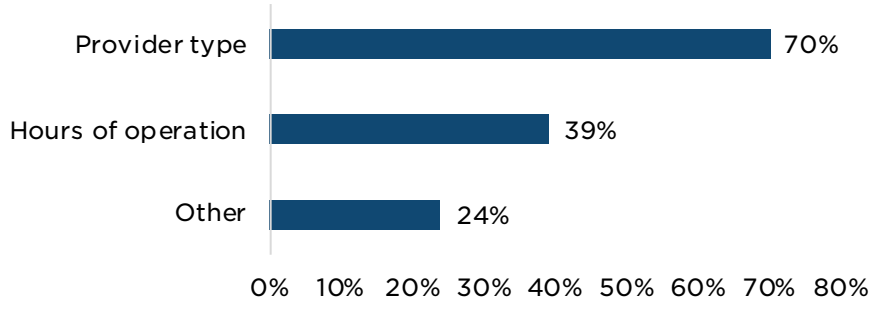
Table 9. Indicators of "Supporting Children's Development": ***Access to Specialized Services***

Construct	Indicator	System- or Family- Level	Considerations
Access to services for children with disabilities	• Indicators include capacity of programs serving children with special needs,[212] capacity of providers with college courses or certification in special education who accept subsidies,[213] number and percentage of providers who report currently serving children with special needs,[214] and other measures of the availability of providers who offer special needs care.[215] • At least one article examined if providers had their medication administration certification.[216]	• System/ Family	• A few reports examine access to specialized services from the family perspective by interviewing parents of children with special needs.[217] • One report includes a statistic on the percentage of parents of children with special needs who say they "feel they have to take whatever form of child care they can get."[218]
Access to services for dual language learners	• Indicators include the capacity (licensed slots) of Spanish-speaking bilingual providers who accept subsidies,[219] the capacity of all bilingual providers who accept subsidies,[220] and the proportion of licensed providers who speak a language other than English.[221] • Several reports include data on families' home language alongside indicators of access to provide information on equity but do not include data on language of instruction.[222,223]	• Family	• Only 15 percent of reports examine language of instruction. Most reports that consider language focus on Spanish, but some reports examine other languages.[224,225] • A few qualitative studies examine how families' home language and providers' accommodations for dual language learners affect parents' ECE choices.[226,227]

Access Dimension IV: Meeting Parents' Needs

The *Access Guidebook* states that for families to have full access to ECE, they should be able to obtain care that "meets the parents' needs." This includes the subdimensions of *provider type* (e.g., center-based, home-based), *hours of operation* (e.g., nonstandard and flexible hours of care), and *other factors* that align with parents' preferences or make it easier for parents to use the care (e.g., cultural match between family and provider).

Figure 5. Percentage of Articles that Address Each Subdimension of "Meeting Parents' Needs"



Subdimensions of "Meeting Parents' Needs"

- **Provider type**
- **Hours of operation**
- **Other factors that align with parents' needs (e.g., access to transportation)**

Approximately 82 percent of sources in our review address the dimension of "meeting parents' needs" in some way. In addition to subdimensions related to *hours of operation* and *provider type*, the literature addresses many *other factors* related to "meeting parents' needs," such as transportation offered by the child care provider,[228] availability of care when a child is sick,[229,230,231] and cultural match between a family and provider.[232,233,234] In some reports, factors related to "meeting parents' needs" are integrated with indicators for other dimensions and subdimensions. For example, indicators may address availability of high-quality ECE that meets parents' need for care at nonstandard hours.[235,236] Other sources address access more broadly in terms of factors that either support or inhibit family participation in ECE programs,[237] factors that affect parents' decisions about ECE,[238] or the absence of constraints for selecting preferred care arrangements.[239]

Despite the family-centered nature of this dimension of access, the majority of indicators and available data found are, in fact, measured at a system-level. This can be explained in part by the distinction between "parental preference" and "meeting parents' needs." A separate line of research on parental decision making examines parents' preferences for ECE as stated directly by parents. However, because this report focuses on the literature addressing access in a more general sense, what is primarily being measured are not parents' preferences but rather the extent to which accessible ECE "meets parents' potential needs." In this way, we can see the usefulness of system-level data, such as *hours of operation* or *provider type*, for highlighting the extent to which local options meet parents' potential preferences for specific provider types or need for care during nontraditional hours and thereby tapping into researchers' and policymakers' desire to look at access from a family-centered perspective. Furthermore, the most thorough and readily available data at local, state, and the national level will be collected using system-level indicators, and that information is evaluated in part through the lens of parents' needs across a variety of factors. That said, we found some examples of family-level indicators, such as reporting on mothers' work schedules or examining the number of requests for non-standard hours of care.

Details on constructs related to the "meeting parents' needs" subdimensions and their prevalence in the literature are presented in Tables 10-12.

Table 10. Indicators of "Meeting Parents' Needs": ***Provider Type***

Construct	Indicator	Family- or System Level	Considerations
Provider Type	• Most articles define provider type as either center-based or home-based care.[240,241,242] • Some articles examine family, friend, and neighbor care or care in the child's own home ("nanny care").[243,244,245,246] • Several reports specify other types of provider types, such as school-based, religious, state-funded, or Head Start.[247,248,249]	• System	• The majority of articles that examine provider type do so from a system perspective in coordination with measures of availability. This allows them to describe the type of care available in a given geographic region.
Parental preference for type of care	• Several qualitative studies examined parental preference for and/or reported use of specific types of care[250,251]	• Family	• A few studies explored the types of care families use through interviews or focus groups as part of a broader examination of ECE access. (Additional work on parental preferences can be found in the literature on parental decision makinge.)

Table 11. Indicators of "Meeting Parents' Needs": *Hours of Operation*

Construct	Indicator	Family- or System Level	Considerations
Supply of care at non-standard hours	• Many reports examine ECE availability (e.g., supply of licensed slots) in early mornings (e.g., before 6 a.m.), evenings (e.g., after 6 p.m.), overnight, and weekends.[252,253,254] • Several reports also examine the availability of part-time versus full-time care.[255,256,257] • One article examines the percentage of programs that serve children in "double-sessions" (two, part-day sessions).[258] • Several reports examine availability of full-year versus school-year-only.[259,260,261]	• System	• Measures of the supply of programs with various hours of operation appear in 13 percent of articles. • We did not find any studies from the past five years that directly compare the supply of care at non-standard hours to the demand for care at those hours.

Construct	Indicator	Family- or System Level	Considerations
Demand for care at non-standard hours	• A few studies examine demand for care at non-standard hours with measures of parents' work schedules.[262,263] • One study examines parent requests for non-standard hour care through child care resource and referral centers.[264] • A few studies used qualitative methods to examine families' need for care with non-standard hours.[265,266]	• Family	• Measures of demand for care at non-standard hours appear in only 4 percent of articles.
Supply of care that allows variable/ flexible hours	• A few reports examine the availability of programs that allow parents to vary their child care schedules from week to week and only pay for the hours of child care used.[267,268] • One study examined the percentage of providers who charge a fee for late pick-up[269]	• System	• Measures of availability of programs that allow parents to vary their child care schedules from week to week appear in 9 percent of the articles.
Demand for care that allows variable/ flexible hours	• One study includes an indicator assessing if the mother worked a rotating or irregular work schedule.[270]	• Family	

Table 12. Indicators of "Meeting Parents' Needs": *Provider Type and Other Factors*

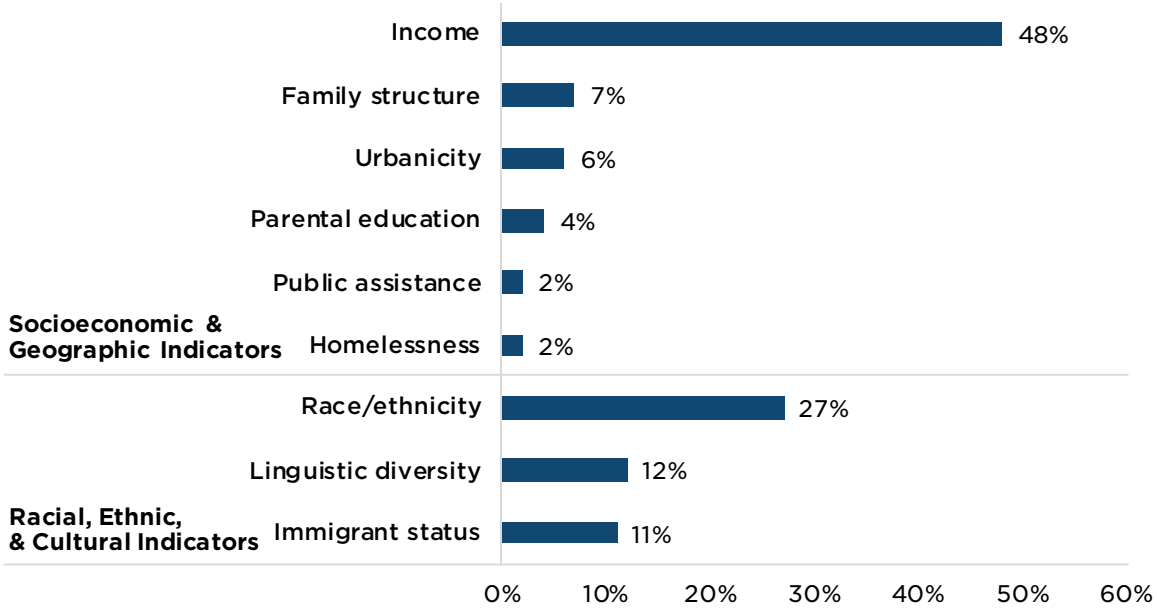
Construct	Indicator	Family- or System Level	Considerations
Parental priorities regarding caregiver characteristics	• A few studies include family rating of the importance of a caregiver's ability to provide care to sick children[271,272,273] • One study includes a family rating of the importance of a "familiar" caregiver (e.g., caregiver of the same racial background, caregiver the family already knew, or caregiver affiliated with the family's religion).[274] • A few studies include family rating of the importance of a cultural match between family and child care provider.[275,276,277] • Several studies included assessments of women's beliefs about the importance of mothers' participation in the labor force.[278,279, 280] • A few studies examined family ratings of the importance of proximity to home, cost, caregiver training, and small group size.[281,282]	• Family	• All of the studies in this category used the ECLS-B National Household Education Survey data on parental priorities regarding characteristics of ECE; in some cases, these measures were combined into an index variable across all or select parental priority measures. • In some cases, measures of parental preferences for child care options (e.g., whether parents preferred a familiar caregiver or caregiver who was a good fit with the family's sociocultural values) were used as a control variable when considering other measures of access (e.g., supply).
Other factors that affect parents' decisions	• Several qualitative studies identified additional factors that affect parents' decisions, including: • Preference for care for multiple children of differing ages in family • Preference for care that coordinates hours of operation with local public schools attended by other children in the family[283] • Need for care for sick children[284]	• Family	• Several articles use survey or interview data to examine what factors affect parents' selection of ECE arrangements.[285,286,287]

Access Dimension V: Equity

Finally, disparities in availability, affordability, quality, and other characteristics of ECE are a key part of the discussion about access. To highlight disparities, 58 percent of the sources we reviewed address "equity," or the ability to reach underserved or disadvantaged children. Some articles focus entirely on a special population, such as families living with incomes below the federal poverty line, children of color, or recent immigrant families. Others examine a wider population and compare indicators of access across diverse groups. The most common populations related to equitable access of ECE included families below the poverty line,[288,289,290] low-income families,[291,292,293] child

care subsidy recipients,[294,295,296] children with special needs,[297,298,299] children of color,[300,301,302] families whose primary language is not English,[303,304,305] immigrants,[306,307,308] refugees,[309] children experiencing homelessness,[310,311] children involved in the child welfare system,[312,313,314] and communities with high poverty density.[315,316,317] Additionally, as described in the "meeting parents' needs" section of this report, some articles examine the availability of providers who are a good cultural match for families.[318,319,320] Figure 6 presents percentages of sources that identified nine distinct categories of variables used to address issues of "equity" with respect to access.

Figure 6. Percentage of Articles that Address Equitable Access for Specific Populations



The tables provided for the "equity" dimension differ from the tables presented for the other four dimensions. Rather than referring to *subdimensions* of "equity," or constructs within subdimensions, we organize population characteristics relevant to equitable access into two groups. The first set of population characteristics can be described as *socioeconomic* and *geographic characteristics* examined with an equity lens. The second set speaks to disparities in access based on *racial, ethnic,* and *cultural* characteristics. Like the tables for other dimensions, we cite 2-3 example studies for each population characteristic and indicate if the studies measure the indicator using family- or system-level data.

Table 13. *Socioeconomic* and *Geographic* Indicators for Measuring Equitable Access

Population Characteristic	Indicator	Family- or System Level	Considerations
Income	• Most studies that break down supply and demand by poverty level typically use federal poverty level categories, such as <=100% of the FPL, 100-200% of the FPL, or >200% of the FPL.[321,322] • Some studies that break down supply and demand by income use an income-to-needs ratio.[323] • Some studies use community poverty density as a measure of examining equitable access.[324]	• System	• Multiple studies allow for data on supply and demand to be overlaid with characteristics such as poverty and income using mapping techniques.[325,326]
Family structure	• Multiple studies use maternal marital status when studying child care use.[327] • A few studies look at the average cost of care as a percentage of the median income of single parent households.[328,329,330] • One study calculates the percentage of households that are married couples versus single parents in neighborhoods with the highest need for ECE.[331] • A few studies also use family size as a contextual factor.[332]	• System	

Population Characteristic	Indicator	Family- or System Level	Considerations
Urban/Rural	• Some studies classify counties as urban or rural based on the USDA rural-urban continuum codes[333] • Some studies examine supply and demand by metropolitan status (central city, metro area but not within central city limits, not in metro area).[334] • One study mapping child care deserts breaks down the percentage of families living in child care deserts by community size: urban (communities with more than 8,000 residents), "rural 1" (communities with 2,000 to 8,000 residents), and "rural 2" (communities with fewer than 2,000 residents).[335]	• System	
Parental education	• Multiple studies examine the type of care used by parents by either the paternal or maternal level of education, where parental education is typically represented as a series of dummy variables indicating if they received less than a high school degree, completed high school, completed some college, or received a college/ advanced degree.[336,337,338]	• System	
Public assistance	• A few studies use receipt of public benefits (TANF, WIC, SNAP, etc.) as an indicator of economic disadvantage or as a community context measure.[339,340,341]	• System	
Homelessness	• One study looks at the number and percentage of providers who report currently serving a child experiencing homelessness.[342]	• System	

Table 14. *Racial, Ethnic,* and *Cultural* Indicators for Measuring Equitable Access

Population Characteristics	Indicators	System- or Family- Level	Considerations
Race/Ethnicity	• Many studies in this category break down supply and demand by common race/ethnicity categories: White, African American, Asian, and Latino.[343] • Some studies break down supply and demand by the racial/ethnic groups represented in their state.[344] • Some studies focus specifically on what access looks like or on challenges to access for a specific racial/ethnic group, such as American Indian or Alaskan Native children,[345] or boys of color.[346] • A few studies look at supply and demand in communities with high percentages of specific race/ethnic groups.[347,348]	• System	• Multiple studies allow for data on supply and demand to be overlaid with characteristics such as race and ethnicity using mapping techniques.[349,350]
Linguistic diversity	• Maternal English proficiency is commonly used as a variable when studying child care use and preference.[351] • Several studies overlay Limited English Proficiency (LEP) rates onto child care supply maps to visually represent access to child care by high versus low LEP areas. These maps also allow additional overlays to look at access by other factors, including subsidy eligibility, SES data, or race/ethnicity.[352,353] • One study breaks down supply and demand by language accessibility.[354] • At least two studies have a particular focus on Dual Language Learner populations.[355,356]	• System	

Population Characteristics	Indicators	System- or Family- Level	Considerations
Immigrant status	• Multiple studies examine access in relation to the immigration status of the child.[357,358,359,360] • A few studies compare access for children of immigrant parents and children of native-born parents.[361, 362] • Multiple studies use parental region of origin (e.g., immigrants from Mexico compared to immigrants from other countries) to make comparisons regarding child care use.[363,364,365] • One study focuses specifically on the challenges to accessing care faced by refugees living in the United States.[366]	• System	• One literature review finds that child care preferences and choice among immigrants and culturally diverse populations reflect experiences and values of their culture.[367] • One study notes the need to examine quality of ECE in communities with high concentrations of immigrants.[368]

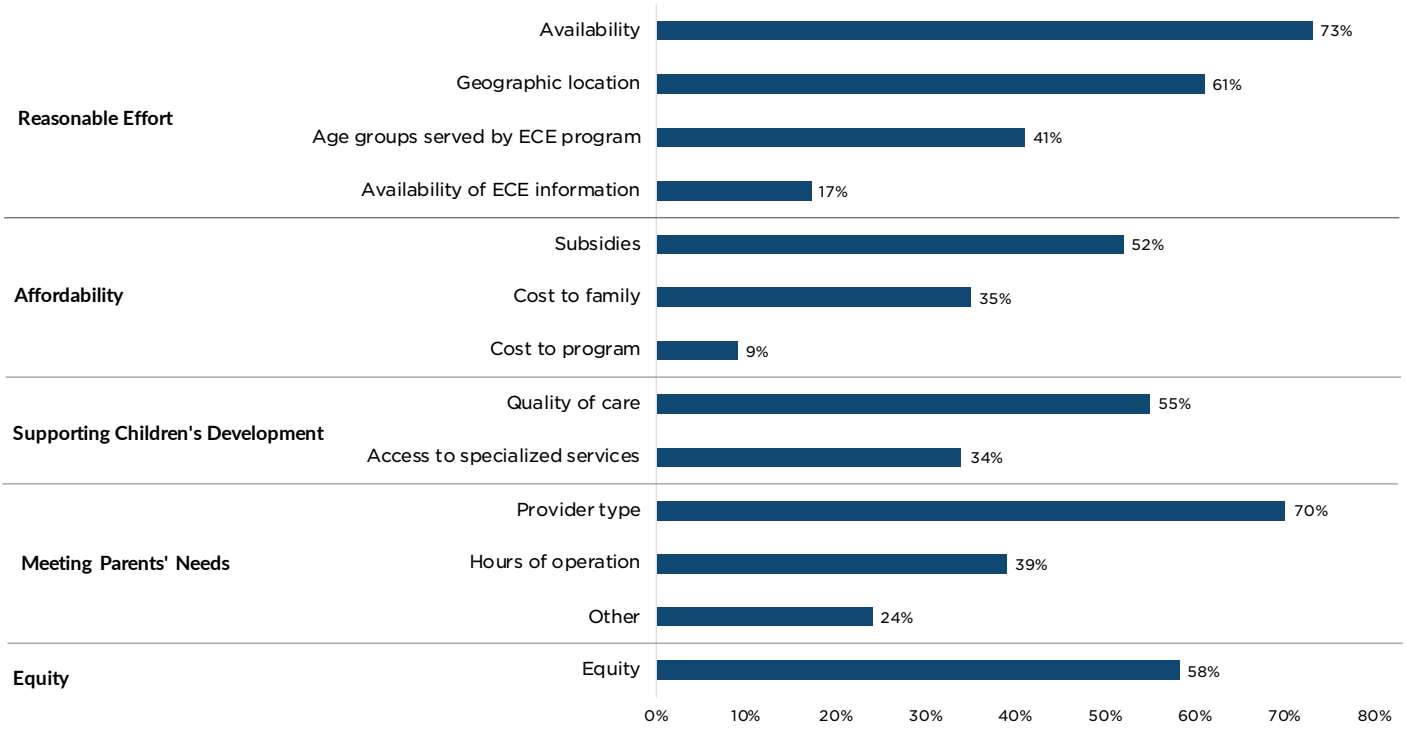
We highlight "equity" here because it is deeply intertwined with all other dimensions of access. It is unique in that it cannot be researched separately from the other dimensions. Examining issues of "equity and disparities" means asking the question, *For whom*? Is ECE available and affordable? Does it meet children's needs in supporting their development? Does it meet parents' needs for *all families* who seek it?

Currently, a subset of research addresses the reality that many families face systemic and structural barriers that limit their access to ECE. Researchers and policymakers can apply an "equity lens" in conceptualizing and operationalizing ECE access by looking at existing studies that have examined the issue in ways that inform a more equitable picture of ECE access. These studies can inform future research and action to reduce disparities to access.

Summary of Conceptualization and Operationalization of Individual Dimensions of ECE Access

A majority (88%) of the reports reviewed in this study operationalize access in terms of at least one indicator related to the dimension of "reasonable effort," which includes *supply, demand*, and *utilization, geographic location,* and *availability of information about ECE*. However, clear evidence from this review supports that additional dimensions of access are also viewed as critical. Three quarters (75%) of the articles and reports reviewed include at least one indicator related to "affordability" of ECE, and approzimately two thirds (64%) include at least one related to "supporting children's development." Most (82%) include at least one indicator related to the dimension of "meeting parents' needs," and well more than half (58%) include at least one indicator related to addressing issues of "equity" in ECE access. Within each of these dimensions, the articles reviewed in this report address a range of subdimensions of access also (see Figure 7).

Figure 7. Percentage of Articles that Address Each Subdimension of Access



While policymakers and researchers have historically tended to focus on a single factor when defining and measuring access, this review that examines reports and research in the past five years finds that access is increasingly being conceptualized and operationalized in a more complex, multidimensional way. Less than 2 percent of the reports and articles reviewed operationalize access using measures related to a single dimension, and only 8 percent operationalize access using measures related to two dimensions. Roughly a quarter of sources operationalize access using measures related to three dimensions. The vast majority of sources operationalize access using measures from four or five dimensions. It is a promising trend that policymakers and researchers are increasingly capturing more of the factors that impede or improve parents' ability to learn about, engage, and logistically use ECE that supports their child's development and meets their needs. However, a key question then emerges: How do these measures intersect, or how are these measures combined? That is, are the multiple dimensions of access being captured and measured independently of one another, each separately reflecting a key element of access; or are the multiple dimensions combined in such a way that allows for multiple dimensions to be considered at once through their intersection or interdependence?

Operationalizing Multiple Dimensions of Access

Sequential Looks Across Multiple Access Dimensions

Some reports combine multiple dimensions of access in a sequential fashion, first reporting on one dimension, then another, without combining the different measures of access into a single composite measure or index. For example, some reports measure access along multiple dimensions, such as availability and affordability, but report these findings separately. A common way to present the wealth of information provided in such multidimensional sequential approaches to measuring access is

through mapping techniques, which can help highlight areas where ECE providers that meet relevant criteria are critically low (e.g., in the case of supply) or critically high (e.g., in the case of cost).[369] For example, a report might present a series of maps with a region divided by ZIP codes. One map might be shaded different shades of color to indicate the ZIP codes with the largest unmet needs, or the difference between the number of eligible children in that region and the number of child care slots available. Another map might show locations of providers. And another map might present average cost of care in a given region as a percentage of the median income for that region. In this way, the report documents multiple dimensions of access, but it does so in a way that captures each of these dimensions independently of one another.

Intersection of Access Across Dimensions

Other reports examine the intersection of, or overlap between, multiple dimensions of access. For example, a state or local agency might be specifically interested in the availability of affordable care or the intersection between availability and cost of care. It is important to understand how dimensions and subdimensions of access intersect, because ECE that is strong in one area (e.g., "meets children's needs" through *high quality of care*) may in fact be inaccessible to children due to barriers in another area (e.g., in terms of "equity," such as for *families experiencing homelessness*). The most frequently highlighted policy-relevant question that considers the intersection of dimensions of access is, Does a geographic area have a large supply of care ("reasonable effort;" *availability*) that is not accessible to families due to largely unaffordable costs ("affordability;" *cost to families*)? We emphasize the "policy-relevant" nature of this question because it represents a meaningful, measurable, and malleable problem that needs addressing to improve access to ECE. Recognizing this issue, many reports examine the intersection of two dimensions of access. These analyses typically combine indicators similar to those used to operationalize individual dimensions, as described earlier in this report. Examples of intersections in the literature include:

- Cost of high-quality care[370] ("affordability" and "supports children's development")
- Cost of care by child age[371,372,373] ("affordability" and "reasonable effort")
- Cost of care by program type[374,375,376] ("affordability" and "meets parents' needs")
- Quality of care by program type[377] ("supports children's development" and "meets parents' needs")
- Quality of care by child age[378,379] ("supports children's development" and "reasonable effort")
- Availability by cost of care[380,381] ("reasonable effort" and "affordability")
- Availability by quality of care[382,383,384] ("reasonable effort" and "supports children's development")
- Availability by program type[385,386] ("reasonable effort" and "meets parents' needs")
- Availability by providers offering nontraditional hours[387] ("reasonable effort" and "meets parents' needs")
- Availability by high- versus low-income areas[388] ("reasonable effort" and "equity")

Additionally, a few reports examine the intersection of three dimensions. Examples of these intersections include:

- Supply of providers who offer non-standard hours and accept subsidies[389] ("reasonable effort," "meets parents' needs," and "affordability")
- Cost of high-quality care, broken down by child age[390] ("affordability," "supports children's development," and "reasonable effort")

- Cost of care as percentage of median income by family structure, age of child, and program type[391] ("affordability," "meets parents' needs," and "equity")

Intersecting data such as the examples above can be mapped using static representations (e.g., maps that use different colors for different provider types when breaking down availability of care by program type) or interactive graphics (e.g., maps that use drop down menus to view intersecting factors using specific criteria). Unlike the maps used in sequential looks at access, which present one dimension at a time, mapping the intersection of two dimensions can present the information in a more policy-relevant way (e.g., including availability of affordable care in one map). In general, examining the intersection of multiple dimensions provides a more complete picture of children's access to ECE and offers a better understanding of how policies or other interventions can improve access.

Access Indexes

Finally, our search revealed two reports that created composite indexes for access to summarize multiple dimensions. These indexes provide an overall score or characterization of access, rather than examining a specific construct at the intersection of dimensions like "affordability" of high-quality care.

First, the *New America Care Report* creates a "Care Index" to rank all 50 states and the District of Columbia on overall ECE access.[392] The index combines measures of cost, quality, and availability. Cost is measured as the average cost of care relative to state median income. Quality is measured using a combination of the percentage of accredited center-based child care providers, the percentage of accredited home-based child care providers, and average *Care.com* ratings for in-home providers ("nannies"). Availability is measured by the ratio of ECE workers to children under age 5, statewide. The Care Index gives equal weight to quality, affordability, and availability and combines them based on each state's distance from the mean using a Z-transformation. The report recognizes the limitations to these calculations and describes the work as exploratory.

Second, researchers at the University of Florida and University of South Carolina developed the "Index of Child Care Accessibility" to identify geographic areas that require policy intervention to improve ECE access for subsidy recipients.[393] The index can be calculated using only administrative data. It is composed of two sub-indexes, "selection" and "infrastructure," which are each characterized as positive or negative. "Selection" compares the proportion of subsidy recipients enrolled with high-quality providers versus non-high-quality providers to the capacity of such providers in the recipients' ZIP codes. This is intended to measure "how well parents are making decisions to enroll their children in the highest quality care given the context of availability in their respective ZIP codes" (p. 5). "Infrastructure" measures the capacity of high-quality care minus the number of children receiving subsidies in a ZIP code. The sub-indexes are then combined in a "policy matrix" to create four possible characterizations of a ZIP code, as depicted in Figure 8: positive infrastructure/positive selection, positive infrastructure/negative selection, negative infrastructure/positive selection, or negative infrastructure/negative selection. These characterizations may be visualized across ZIP codes using a color-coded map that can be further customized. For example, the researchers added the population density maps of children using subsidies based on home address to the index layer to help inform policymakers of areas that, if changed, would impact more children. They also plotted child care providers by type, status as eligible to serve subsidy recipients, size, and quality designation to provide additional information to guide action. Each of the four characterizations comes with recommendations for policymakers, such as improving parent awareness of high-quality options or increasing the supply of high-quality care.

Figure 8. Policy Matrix from the Index of Child Care Accessibility

		Selection	
		Positive	Negative
Infrastructure	Positive	+/+	+/-
	Negative	-/+	-/-

Source: Knopf, H., Sherlock, P., & Zhou, S. (2018). *Pilot Study: Application of the Index of Child Care Access among Five Early Learning Coalitions in Florida.* Gainesville, FL: The University of Florida Childhood Needs Assessment Partnership.

These two reports provide excellent examples of efforts to summarize access across multiple dimensions. Further development of access indexes could be of great benefit to the field. It is important to remember that indexes and other access measures serve a variety of purposes. While an overall composite score for access is useful for equity analyses and other comparisons, measures of specific dimensions or constructs at the intersection of dimensions may be more useful for identifying potential policy interventions. The Index of Child Care Accessibility's "policy matrix," which characterizes geographic areas by the type of policy interventions they need, is an example of how an access index can connect directly to actionable policy recommendations.[394] Both examples of indexes further illustrate how researchers can use system-level data to achieve the recommendation of the *Access Guidebook* to bring a family-level perspective to the field's understanding of ECE access. Direct input from families about their experiences accessing ECE is a necessary, but not sufficient, piece of the puzzle; a comprehensive access index based on administrative and other system-level data helps complete the puzzle for policymakers by placing families' experiences within the context of the systems that ultimately prevent or facilitate access to ECE.

Ongoing Challenges in Conceptualizing and Operationalizing Access

While the reports reviewed in this present study vary widely in how they conceptualize and operationalize access, researchers and policymakers are increasingly recognizing ECE access as a complex, multidimensional concept. In addition, considerable efforts are being made to measure access across multiple dimensions. However, in practice, the way in which access is defined and measured in particular cases often depends on the availability of data relevant to the dimensions of access and the specific context and policy questions being addressed. This lack of clarity and consistency in defining and operationalizing access challenges the field's ability to reliably examine disparities in access particularly in ways that can be compared across studies and over time. It also complicates the field's ability to develop policies and initiatives to improve access and to evaluate their effectiveness. Moreover, with various sources of information informing the understanding of multiple dimensions of access, it can be difficult to merge these disparate sources of information to paint a complete picture of access. Following are some of the ongoing challenges to conceptualizing and operationalizing access that emerged from this review of the literature.

Coordination of a Systems Perspective and a Family Perspective on ECE Access

Despite efforts to address multiple dimensions of ECE access, current research and practices often struggle to jointly apply, in practice, a systems perspective and family perspective to understanding and measuring access. Traditionally, access has been predominantly examined from a *systems perspective*; that is, access has been perceived as *an attribute of services, determined by factors and constraints on the supply side, such as availability and cost*. This perception likely stems from the fact that such system-level factors are amenable to change in the face of targeted policies aimed to improve access. However, access is increasingly also being seen from a *family perspective*, with measures of access also incorporating *demand-side factors related to characteristics of families*. For example, it is not simply the location of an ECE provider that will have an impact on access but also a family's ability to travel to those services. A more family-centered approach to conceptualizing access could also include various factors related to the abilities of families to seek, obtain, and logistically use ECE services appropriate to their needs. Such conceptualizations of access consider not just supply and demand of services but also the process by which services are sought out and used.

This review of the literature suggests that many sources recognize the influence of family characteristics and system-level factors on access. However, the operationalization of access may not always be able to fully capture, in practice, all factors incorporated in a source's conceptualization of access. That is, many articles and reports acknowledge that several dimensions of access are important and cite other literature on the role of those dimensions but do not measure all those dimensions themselves. This may be, in large part, due to lack of availability of data on a range of family-centered measures. In particular, many reports rely heavily on administrative data, which is by definition system-level data, with access to family-level data requiring supplementary, and often qualitative, data collection efforts.

For example, while indicators of supply, demand, and use of ECE are commonly used to measure availability, very few studies examine the availability of information about ECE programming (see Figure 7). Yet, if parents are not aware of the range of services located nearby or have uneven knowledge about different types of care, the availability of subsidies, or if the services provided meet their needs, their access to these "available" services will be unfairly restricted. Similarly, while measures of "affordability" and quality are also increasingly being incorporated in one form or another into a number of reports and studies, for the most part these measures are collected at the system level. As a result, many studies report on the direct cost of ECE services to families and administrative ratings of quality, but relatively few studies consider related expenses and opportunity costs, such as cost of transportation and travel time, or other factors related to "supporting children's development," such as specialized services for children with disabilities or dual language learners. With respect to the dimension of "meeting parents' needs," many studies may break supply down by *provider type, age groups served,* and even *hours of operation*, but very few examine factors related to parental preferences regarding stability of care arrangements, flexibility of providers to accommodate parents with variable schedules, and a provider's fit with a family's culture and values. Finally, this review finds that there is greater interest in examining disparities in supply of ECE services, thus additional work should also incorporate potential differences in demand and additional barriers to use and fit of services to meet the needs of different cultural, socioeconomically disadvantaged, and vulnerable populations.

Challenges to a Multidimensional Framework

An additional challenge to a multidimensional conceptualization of ECE access is that measuring all of the various dimensions of access is not an easy task. While various indicators are available to measure a number of the individual factors related to access, it is not clear how to combine or weigh these different measures to examine the extent to which the characteristics of services, providers, and systems are aligned with the needs of children, families, and communities. Many of the sources reviewed in this report examine multiple dimensions of access but often do not examine

the dimensions jointly. The two recent reports that create an access index to combine dimensions in meaningful and measurable ways offer great promise in this task.

Conclusion and Key Findings

This review of the literature investigates and catalogues current efforts to define and operationalize access particularly looking at the extent to which current work at the state and federal levels conceptualize and operationalize ECE access from a multidimensional perspective. The key findings with respect to current practices in conceptualizing and measuring access are described below.

Availability, affordability, and use of ECE services continue to be the foundation for most conceptualizations of access; however, more recent efforts to define access span multiple dimensions. These include access to services that support the child's development and the parents' needs and the removal of structural barriers to ECE for socially or economically disadvantaged or at-risk populations. More than 90 percent of the reports and articles reviewed explicitly define and measure access in ways that include at least three of the following dimensions of access: "reasonable effort," "affordability," "supports children's development," "meets the parents' needs," and "equity." In line with a more family-centered approach to understanding access, most reports (85%) include in their conceptualization of access factors that influence a family's ECE choices or decision making. Many sources also address issues of "equity," with more than half (61%) of the reports highlighting the capacity of ECE providers to reach and engage underserved, disadvantaged, high-risk, or vulnerable populations as an important component of access. One could argue that all issues of access touch on issues of equity and disparities in families' ability to find and use the ECE models they seek. However, we discovered that a still-considerable portion of current research often remains focused on supply and demand, or cost, without necessarily digging deeper into how those dimensions impact different populations in unequal ways.

Changing conceptualizations of access have also impacted measurement. Availability remains central to the definition of access and is often measured in terms of "unmet need," or the gap between supply and demand within a specific geographic region. However, much of the literature reviewed breaks down availability by factors that incorporate a range of dimensions or subdimensions of access (e.g., *availability of affordable care, availability of high-quality care, availability of care by provider type*, etc.) A number of studies also examine disparities in ECE by breaking down the analyses of *availability, cost, and quality by race/ethnicity, family income level, urbanicity, family structure* (one- or two-parent homes), and *English-language proficiency*. Studies also captured a range of family-centered characteristics of access with a few including less frequently examined factors, such as proximity of care to family residence or parent workplace, accessibility by public transportation, and/or hours of operation that include non-standard work hours. These studies provide examples for the field on how to include a wider spectrum of factors that can facilitate or limit families' access to ECE.

Challenges remain in operationalizing ECE access from a multidimensional perspective. While researchers and policymakers are beginning to recognize ECE access as a complex, multidimensional concept, some challenges remain. Perhaps most important is the limited availability of data that capture key elements of *parental decision making*. For example, there is less information and research available that examines the availability of information about ECE options for parents or resources for finding ECE that is affordable, high-quality, and meets families' needs. Similarly, little research looks explicitly at how the interplay of affordability and other factors affect parents' decision making. Additional factors that may be important for understanding parental choices include beliefs about the role and benefits of parental versus non-parental care, the cultural match between a family and provider, the consistency of care across multiple children, the inclusion of school-age children, and the capacity of the provider to support the development of children with specialized needs. The studies that do explicitly address family-level factors often make assumptions in their measurement (e.g., how far a parent is willing to travel for care.) More research – particularly qualitative research and research that includes parents' perspectives – is necessary to explore the accuracy of these assumptions. In

addition, prior and continuing work on factors that influence parents' decision making in their child care choices[395,396,397] should be integrated into the discussion and measurement of access in the context of a multidimensional framework.

Another challenge to defining and measuring access is variability in specific measures related to subdimensions of access (e.g., lack of a common language or set of criteria for determining what counts as an available provider or child care slot [licensed versus non-licensed, center-based versus home-based], which children count as needing care [all children of a certain age, only children with both parents in the workforce, etc.], what is the threshold of affordability, what counts as high quality, etc.) Consistency in measurement also requires consistency in how data are collected. Finally, continued methodological work is needed to explore how to combine data on different dimensions of access, often drawn from different data sources, to draw a more complete picture of access in all its complexity but practical enough to be of use to policymakers.

Recommendations for Future Research

The findings of this present report support the following recommendations for future research and work on establishing consistent ways to conceptualize and operationalize ECE access that are meaningful in practice, measurable with reliable data, and able to inform policies that improve families' lives.

- Future work needs to include family-centered measures of access that incorporate more demand-side factors related to *the expressed needs of families*, such as the capacity to travel to services, parental preferences regarding care arrangements for multiple children and the stability of care arrangements, the need for care arrangements that include non-standard or flexible hours, and a family's preferences with respect to linguistic and cultural fit. Additionally, families should be asked directly about the availability and accessibility of general information about ECE programming in their area; and opportunities to quantify the availability of information about ECE options will likely increase as states enhance their consumer education websites required in the reauthorization of CCDBG.
- Future work should also incorporate research on potential differences in preferences and additional barriers to the use and fit of services to more equitably meet *the needs of different cultural, socioeconomically disadvantaged, and vulnerable populations*. These data could be achieved by recruiting and oversampling specific populations on ECE access to highlight these potential differences in preferences and barriers. Collecting qualitative data from families whose voices are underrepresented in research can add new perspectives on existing needs and challenges. States and localities can identify tailored outreach strategies to ensure they incorporate the diverse characteristics of families they serve.
- Quantitative and qualitative research methods should be integrated, so the lessons learned from qualitative data can be used to design tools and measures in quantitative studies.
- How to best *merge, combine, and/or weigh different measures of access* across multiple dimensions needs continued exploration.
- More work and discussions are required to achieve clarity and consistency in defining and operationalizing access in the field and in the assumptions that go into specific measures.
- Future work should demonstrate a commitment to applying an "equity lens" in conceptualizing and operationalizing ECE access by looking to existing research that has intentionally examined the issue in ways that can inform a more equitable picture of ECE access.
- Moreover, work is needed that accounts for *community contexts* and the alignment of community needs and existing services.
- Finally, researchers and policymakers focused on increasing access to ECE should remember that equitable access is a necessary, but not sufficient, step toward achieving more equitable *outcomes* for children.

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