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Better Data for Designing Early Childhood Systems that Meet the Needs of Families

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When a community needs to estimate how many third graders will enroll in public schools in the next year, the task is relatively straightforward. All children receive the same basic service, supported by a consistent funding structure, so all that is needed is a projected number of children of a given age and historical data on the percentage of families who opt for public education.

The early childhood field has long recognized that the mismatch between families' needs and available services is a problem. This brief presents a path to addressing that gap: one that starts with what families actually need and produces the demographic precision necessary to design, fund, and expand services accordingly.

Estimating demand for early childhood education and care, however, is an entirely different problem. Families' early education and care needs vary widely, as do the funding streams available to address these needs. Some families require full-day, year-round care for their young children while they work; others need only a part-day program because a parent is home. Some families qualify for Head Start or child care subsidies while others pay out of pocket. And some children need comprehensive wraparound supports, such as nutrition, health, and social services, integrated with their early learning program. The result is a system where the right mix of services in any given community depends not just on how many young children live there, but on the precise intersection of their families' work schedules, income levels, and circumstances.

This complexity is what makes community-level planning for early education and care so difficult. A provider considering whether to expand to a full-day, year-round program doesn't just need a population count. They need to know how many children in that community have all parents working, which of those children qualify for the Child Care and Development Fund, and which might be served through Early Head Start-Child Care Partnerships. A school district designing pre-K access for low-income three- and four-year-olds must distinguish between families who can use a school-day program and those who need extended-day, community-based options because the parents work full time.

As early childhood programs expand to serve more children, policymakers are called upon to consider cross-program coordination and ask system-level questions. This brief explores whether commonly used metrics, such as counts of children by age, income eligibility tallies, and rough estimates of child care need, are the only data available to inform these conversations. These measures routinely leave communities with an incomplete picture, leading to programs that are mismatched to families' actual needs and wants. Are there better ways to use data and tools to produce fine-grained, reliable estimates of how many families need each type of early childhood service, and to use that precision to plan, build, and finance an adequate and efficient system of early childhood services? Our recent work with

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communities in Illinois points to the promise of small area estimation techniques to provide the population-level information that system leaders need.

Current Approaches to Measuring the Need for Early Childhood Services

There are many approaches that communities typically use to measure the need for early childhood services in a given geography, each providing a general understanding of need. These measurements differ in small ways that shape what is actually being represented, and these important nuances are articulated below.

Population of young children. The most common way to define the need for early childhood services in a given geography is to look at the total population of children under age 6, sometimes broken out into smaller age bands and with various approaches to handling birth cohorts and excluding children enrolled in kindergarten.[1]

Population counts overwhelmingly draw from American Community Survey (ACS) data from the U.S. Census Bureau and may use either 5-year ACS data (which can be used to look at narrower geographies, like city neighborhoods, but lacks temporal specificity) and 1-year ACS data (which is temporally specific but is only analyzable for larger geographies). They may include basic cross-tabulations that highlight specific subpopulations, such as children from low-income households or households where the primary language is not English.

Population counts tell us about the size of the population the early childhood system needs to serve, but not about the specific service array that is needed. They establish an overall measure of the population affected by the early childhood system and can also highlight the size of subgroups that are historically underserved or who require particular (often more expensive) services, such as very young children or those with special needs. But they do not account for many of the characteristics, such as parental employment, travel patterns, the presence of older siblings, or family preferences, that inform which types of services would most benefit families.

Children eligible for a funding stream. Many of the largest sources of public funding in early childhood are intended to serve specific populations. Head Start (and Early Head Start for children ages 0-3) is designed to serve children at or below the poverty line. The goal is to provide comprehensive supports to children from low-income households, including physical and oral health, nutrition, early learning and care, while also providing supports for their parents. State child care subsidy programs, funded through the Child Care and Development Fund (CCDF) and state funds, are intended as workforce supports, so they define eligibility both through family income and parents' work status. State pre-K, where available, is

[1] See for example recent assessments of child care needs and gaps in Washington, DC and San Francisco, CA: Joe Fretwell, Shelly Masur, Isabelle Donohoe, Tim Green, Molly Kaminski, and Shruti Rathnavel, *Assessing the Gap: An Evaluation of Current and Projected Future Child Care Supply and Demand in the District of Columbia* (Low Income Investment Fund, 2024), https://www.liifund.org/app/uploads/2024/11/Report-1-Assessing-the-Gap_opt.pdf and San Francisco Child Care Planning and Advisory Council, *San Francisco Early Care and Education 2023 Needs Assessment Report* (2023), https://sfcpac.org/wp-content/uploads/2023/08/FINAL-CPAC-2023-Needs-Assessment-Full-Report.pdf.

largely focused on school readiness, and may be targeted towards "at-risk" children or be a universal service.

It is possible to estimate the eligible populations for each of these programs with more or less complexity. For example, estimating eligibility for child care subsidies requires estimating the number of children who meet both required criteria for both household income and parental employment.[2]

But eligibility counts are difficult to interpret under real-world conditions. Children and families are often eligible for multiple early childhood funding streams; what appears to be underenrollment in a funding stream may simply reflect children who are eligible for multiple programs selecting other options. Also, providers frequently rely on a mix of funding to operate their programs. Providers may need estimates, for example, of the number of children in a given geography who are eligible for both Head Start and child care subsidy.

Children with working parents. Estimates that focus on child care demand are often limited to counting children in households where all parents are working. For example, the Buffett Early Childhood Institute at the University of Nebraska publishes a Child Care Gaps Assessment at the local (e.g., county, metro area) level for the nation. That assessment characterizes "potential need" for child care as the number of children age 5 and under with all available parents in the labor force.

Understanding child care needs requires more than knowing whether parents work, however. As we can see with data from the 2019 National Survey of Early Care and Education (NSECE), how parents structure their work schedules matters too. All parents worked in about 50% of families of children under 5 in 2019. But for children in two-parent families where both parents work, part-time or staggered schedules limited child care needs. The NSECE reported that both parents were working for an average of just 23 hours per week in these households. In 12% of two-parent working households, schedules were fully staggered: only one parent ever worked at a given time. Parents' work schedules may also create need for child care at non-standard hours; in families with one working parent, parents worked an average of 39 hours per week but of that time, an average of 9 hours of work fell before 8am, after 6pm, or on weekends.[3]

Projected enrollment. We began this brief with the example of elementary schools estimating future enrollments by grade. One approach to estimating future demand in a given community is modelling based on prior years' participation, similar to how districts approach future enrollment. This approach incorporates an estimate of parent choice. For example, in planning for universal pre-K, the City of Chicago used data from Chicago Public Schools (CPS)—including kindergarten enrollment, pre-K waitlists, and city-funded community-based pre-K enrollment—to estimate demand for universal pre-K.[4] Their approach borrows from kindergarten estimation and assumes that only about 5% fewer families will enroll their child in pre-K, yielding an estimated 64% enrollment rate for 4-year-olds. This estimate is further refined using a parent choice model that incorporates demographic and enrollment trends to predict family preferences between CPS school-based programs and community providers offering flexible hours and comprehensive services.

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[2] Nick Mader, Hyein Kang, Leah Gjertson, and Robert Goerge (2025), *Assessing Patterns & Geographies of Child Care Subsidy Take-Up for Illinois*, Chapin Hall, https://www.chapinhall.org/wp-content/uploads/Chapin-Hall_Assessing-Childcare-Subsidy-Take-Up_March-2025.pdf.
[3] Joshua Borton, A. Rupa Datta, and Ilana Ventura (2021*). 2019 NSECE Snapshot: Parent Work Schedules in Households with Young Children*. OPRE Report #2021-187. U.S. Department of Human Services Administration for Children and Families Office of Planning, Research, and Evaluation.
[4] Chicago Early Learning (2019), *Chicago's Roadmap for Implementing Universal Pre-K: A Plan for Investment in Chicago's Early Learning System*, https://www.actforchildren.org/wp-content/uploads/2024/04/ChicagosRoadmapForImplementingUniversalPreK2019.pdf.

The obvious limitation to estimating need for future services based on historical enrollment patterns is that this approach cannot be used to understand how children and families will respond to changes in the available options or what these families actually need. Parents might make different choices if different options were available. Services may also have value for parents and families that those families do not currently understand; in which case, marketing and awareness campaigns could create shifts in demand.

Summary of current approaches. Table 1 summarizes what is measured and what is missing in each of the approaches described in this section.

Table 1. Summary of Current Approaches to Measuring the Need for Early Childhood Services

Approach	What It Captures	Limiting Assumptions
Basic population counts, including simple subpopulations	Full universe of children with potential to receive services (early education focus)	Assumes all slots are equivalent—doesn't account for specific service needs, such as extended day care.
Children eligible for a funding stream	Universe of children eligible for existing funding streams	Looks at programs in silos: Assumes children should participate in any service for which they are eligible, even where eligibility criteria overlap. Does not account for where the same funding stream could potentially be repurposed to fund different program models, like center-based or home-visiting approaches. Finally, by defining populations based on current policy, this approach limits the possible policy levers to working within existing programs and funding streams.
Children with working parents	Children from families that may need child care	Does not provide enough nuance to understand when care is needed and which type of care might best meet families' needs and preferences.
Projected enrollment	Children likely to participate or whose parents are seeking services	Assumes family decisions are independent of program availability. Ignores potential benefits of early education that might be desirable for all children and which parents might embrace if provided in an accessible way and if their benefits were clearly explained.

As this table highlights, the biggest limitation of existing measurement approaches is that either they do not distinguish between types of care needs or, when they do so, they look only at the silos of existing funding streams or basic cuts of parental employment. There is a need for data on child populations that informs service planning in the context of early childhood: understanding who communities aim to serve and what families seek, and providing granular enough information to feed this conversation.

Case Study: Data for Service Planning in Lake County, Illinois

The Center for Early Learning Funding Equity (CELFE) and NORC recently piloted a new approach to measuring the need for early childhood services designed to directly inform a service planning exercise in Lake County, Illinois. County stakeholders needed data that gave them a sense not only of how many children needed to be served, but also some indicator of the kind of services that would be most helpful to families and were most likely to be used. By targeting funding and capacity goals to specific program types and locations, this effort aimed to better target scarce public dollars toward services that meet the actual needs of children and families in communities across the county.

First, CELFE analysts worked with Lake County stakeholders to develop profiles of child and household characteristics—in this case, combinations of age, household income, and parental employment status—that stakeholders felt would reasonably predict the services that families would want and use if they were available, affordable, and convenient. Table 2 shows these profiles and mappings. Note that these service assumptions represent the service models and community preferences for different family types as stakeholders saw them in Lake County; they are not intended to be profiles and service assumptions applicable to all communities (see box).

What characteristics drive family need?

This case study uses basic assumptions: the need for early education for all preschoolers and full-day child care for families with working parents, with a nod to how comprehensive services can benefit low-income families in particular. Our analyses and discussions considered a much richer set of characteristics, however, including factors like home language status, child disability or developmental delay, and work during non-traditional hours, that could reasonably inform different profiles. Early education and child development specialists, case workers, and families themselves likely have their own perspectives on what characteristics most drive the need for early childhood services. Vignettes presenting families with hypothetical sets of characteristics could be used to rigorously infer how to weigh or consider different characteristics for particular audiences in future work. Characteristics of local environments, like geography, infrastructure, and culture, will also impact what services are most appropriate for a given profile in a certain area.

Table 2. Family Profiles and Service Assumptions - Lake County Analysis

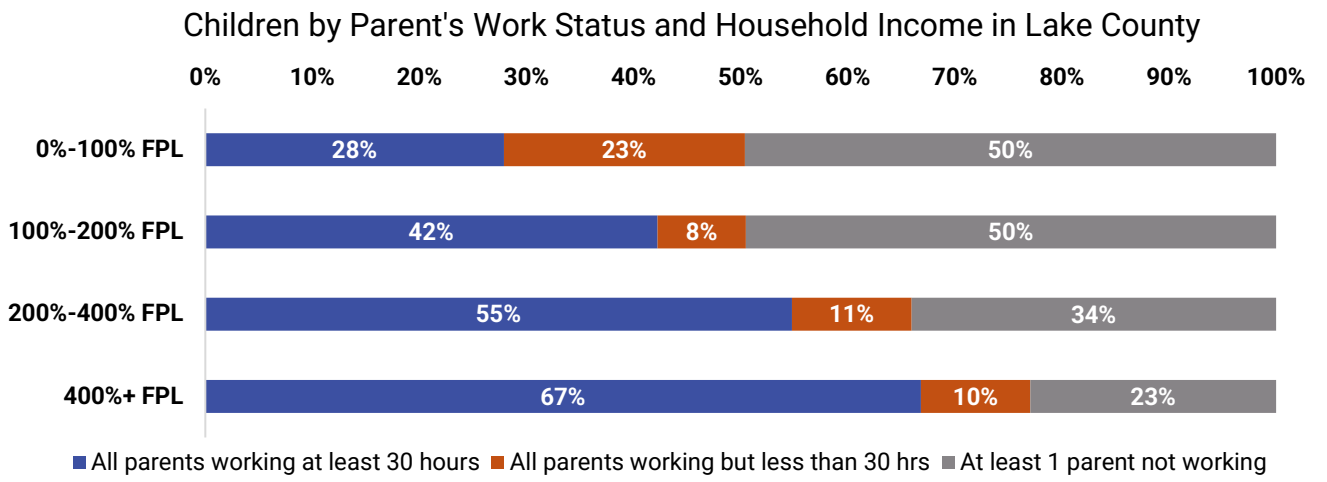
Family Profile			Service Assumption from Lake County Stakeholders
Child Age	Parental Employment	Household Income	
Infants and toddlers	At least 1 parent who does not work full-time	Any household income	No formal ECE program
	All parents work full-time	Under 200% FPL	High-quality, community-based, full-workday programs that provide comprehensive services
		Over 200% FPL	High-quality, community-based full-workday programs

Family Profile			Service Assumption from Lake County Stakeholders
Child Age	Parental Employment	Household Income	
Preschoolers	At least 1 parent who does not work full time	Under 200% FPL	High-quality, school-based, school-day preschool with comprehensive services
		Over 200% FPL	High-quality, school-based, school-day preschool
	All parents work full time	Under 200% FPL	High-quality, community-based, full-workday programs that provide comprehensive services
		Over 200% FPL	High-quality, community-based full-workday programs

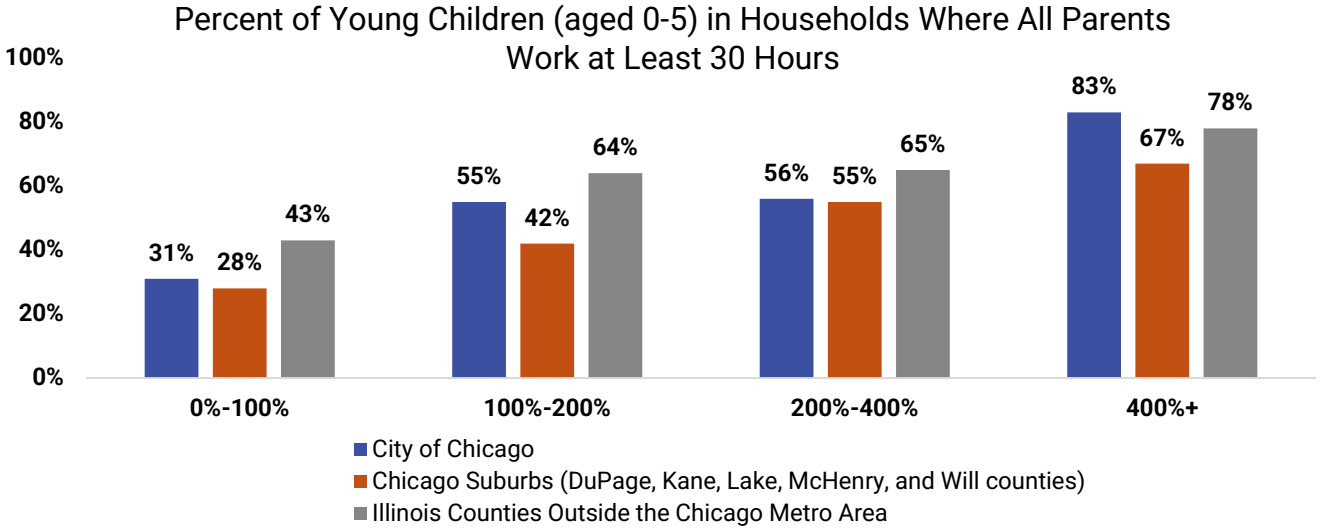
By developing family profiles connected to specific service needs, CELFE and its Lake County partners were prepared to seek a more actionable measurement of community need. However, counting the child population became more complex because it was necessary to estimate the population in each of these smaller groups. Measuring these populations requires layering multiple household and family characteristics and then calculating the size of populations where they overlap in different configurations.

While American Community Survey (ACS) data remains the best available data source for understanding populations of young children, estimating such small slices of the early childhood population in Lake County strained the available sample size and reliability of the estimates. For a proof-of-concept to support Lake County, the CELFE and NORC teams drew on our local knowledge of the county and the Chicago metropolitan area. We made the starting assumption that patterns of parental employment by child age and household income across the Chicago suburbs are largely consistent with those in Lake County and developed an estimate of the prevalence of different profiles based on this assumption.[5] For example, the figure below shows how parents' work status in the Chicago suburbs varied by household income. In particular, households under 200% FPL were much more likely to have at least one parent not working than households with higher incomes, and households under 100% FPL were more likely to have at least one parent working part-time. We combined this estimated prevalence with ACS estimates of the number of children 0-5 in low-income households in different parts of Lake County to estimate the number of young children needing different types of services.

[5] For reference, there were an estimated 43,863 children aged 0-5 in Lake County in 2023, represented in the 2023 ACS 1-Year Public Use Microdata (PUMS) sample by 351 unweighted observations. Across the five collar counties comprising the Chicago suburbs (DuPage, Kane, Lake, McHenry, and Will), by contrast, there were an estimated 200,048 children aged 0-5, represented by a sample of 1,780 unweighted observations. These small sample sizes become particularly challenging when looking at low-income populations, since only about 20% of those children came from families with low incomes.



As we implemented this approach, we wondered how much local-level variation we would find across different geographies in these household characteristics. To test, we compared the prevalence of parental employment by household income across three different geographies: the counties that comprise suburban Chicago, the city of Chicago, and all Illinois counties outside of the Chicago metropolitan area.[6] Our next figure presents these findings and demonstrates the importance of estimating these patterns at local levels to inform localized service planning. In particular, for all but the highest income households, full parental employment is most common outside the Chicago metropolitan area and least common in the Chicago suburbs (although differences between the suburbs and the city are not pronounced). For the highest income households, earning more than 400% FPL, Chicago households are most likely to have all parents working full-time; suburban households are least likely, and other Illinois households fall in between.



Source: Calculated from U.S. Census Bureau, American Community Survey (ACS) 1-Year Public Use Microdata Sample (PUMS), 2023.

[6] Although the majority of Illinois counties outside the Chicago metropolitan area are rural, population is heavily concentrated in smaller Illinois cities (e.g., Peoria, Rockford, Champaign-Urbana, Springfield, East St. Louis). It is appropriate to think of these numbers as representing patterns in those smaller metropolitan regions rather than in rural Illinois.

While our rough estimates from ACS data provided a starting point for this specific, county-level analysis, rigorously and robustly calculating the prevalence of different, detailed family profiles at the local level would require complex applications of small area estimation techniques (see insert). Small area estimation could be used to mathematically and rigorously scale our initial assumption (based on local knowledge) that the Chicago collar counties could provide a proxy for patterns in Lake County.

How do we measure the size of such specialized populations?

Small area estimation is a set of statistical methods used to produce reliable estimates for places or population subgroups where survey data alone are too limited to give stable results. Instead of relying only on the data available for each geography, small area estimation uses statistical modeling to identify patterns and relationships—such as how parental employment patterns and household characteristics vary with income and community context—and uses those relationships to "borrow" analytic strength from geographies with similar characteristics to estimate quantities of interest. Small area estimation takes sampling error into account in rigorous ways, which would allow us to understand whether differences across populations are statistically significant. Finally, a small area estimation model could also incorporate multiple data sources beyond the ACS to improve the robustness of estimates. For example, data on labor markets, such as employment in certain industries or occupations, could be used to refine estimates of households with child care needs during non-traditional hours, a persistent barrier for service planning conversations.

Conclusions

The Lake County case study makes clear both what is possible and what remains out of reach with current approaches for estimating demand for early care and education services. By revisiting our assumptions about what data are available for service planning and focusing on the information policymakers really need to think about early childhood systems, we were able to produce nuanced estimates that suggest not just how many children and families potentially need to be served, but what types of services they may need and want. That level of specificity is precisely what community-level planning for a robust early childhood system requires.

Our Lake County work made assumptions that draw from local knowledge, including treating a given set of counties as proxies for Lake County, and neglecting standard errors, which would tell us how precise these estimates really are. These assumptions were appropriate to the stakes of the project. Having seen how effective these data can be for planning and decision-making, however, we feel that bringing this level of nuanced data to scale in early childhood can provide real value to communities nationwide.

Small area estimation models could rigorously estimate targeted populations in communities around the country. Community stakeholders understand intuitively how the early childhood needs of their communities are unique; while existing national data sources that describe families' needs are helpful for broad policy conversations, local communities need these data adapted to their community lens. By borrowing statistical strength across geographies with similar characteristics and integrating multiple

data sources beyond the ACS, small area estimation techniques can produce reliable, fine-grained estimates of how many families need each type of early childhood service, even in communities where survey samples are too thin to support that analysis on their own. Paired with the kind of stakeholder-driven profile-building demonstrated in Lake County, small area estimation approaches can transform community needs assessment from a rough approximation into a genuine planning tool.

The early childhood field has long recognized that the mismatch between families' needs and available services is a problem. Now there is a path to addressing this gap: one that starts with what families actually need, and produces the demographic precision necessary to design, fund, and expand services accordingly.

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