



Using Maps to Inform Decisions about Child Care and Early Education

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Introduction

Access to child care and early education (CCEE) 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.”¹

Federal, state, and local leaders are increasingly focused on improving access to high quality CCEE in part because of requirements outlined in the Child Care and Development Block Grant (CCDBG) Act of 2014. CCDBG encourages states and territories to improve CCEE access, especially for children in underserved areas, infants and toddlers, children with disabilities, children who receive care during nontraditional hours, and children living in areas with significant concentrations of poverty and unemployment. **Maps visually present information about CCEE access that can help CCEE leaders make decisions about how to support children, families, and providers.**

The goal of this resource is to assist CCEE leaders in using maps to make data-driven decisions about how to improve CCEE access.

- In Part 1, we describe how leaders can use maps to make decisions about CCEE access across four areas: policy effects, resource allocation, supply building, and supporting families. We also outline how CCEE leaders can engage partners to inform this decision-making process.
- In Part 2, we outline technical considerations for developing maps about CCEE access. These considerations are organized into three areas: selecting the appropriate data to include for ease of decision making, choosing an analytic approach that supports decision making, and displaying map contents to support decision making.

This product was developed as a part of the [*Initial Effects of Child Care Reauthorization on Child Care Markets*](#) project. The goal of the project is to understand early implementation of the Child Care and Development Block Grant Act of 2014.

This contract was awarded by the Office of Planning, Research, and Evaluation (OPRE) to MEF Associates with a subcontract to Child Trends. Additional federal partners included the Office of Child Care and the Assistant Secretary for Planning and Evaluation.

Approach

Between October and December of 2021, the research team conducted an online search to identify which states, territories, and localities display CCEE access geographically on a map. In total, we identified 75 maps and found that nearly all states and territories had developed at least one map. We also recorded the type of information presented on each map, such as the type of child care or other demographic characteristics. In general, the scan revealed that many maps included information about multiple CCEE settings (e.g., licensed centers, family child care, pre-K), and some included information about community-level characteristics (e.g., income, race/ethnicity) so that users could contextualize access within communities.

¹ Friese, S., Lin, V.K., Forry, N., & Tout, K. (2017). *Defining and measuring access to high quality early care and education: A guidebook for policymakers and researchers* (OPRE Report #2017-08). Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services. p 5.

Paschall, K. & Maxwell, K (2021) *Defining and measuring access to child care and early education with families in mind* (OPRE Report #2021-232). Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

We reviewed the available maps to understand the types of decisions CCEE leaders could make when using the maps. We then invited individuals who had created maps to talk with us about their experiences. We spoke with four CCEE mapping teams and incorporated their input into this guide. During these conversations, we asked experts about:

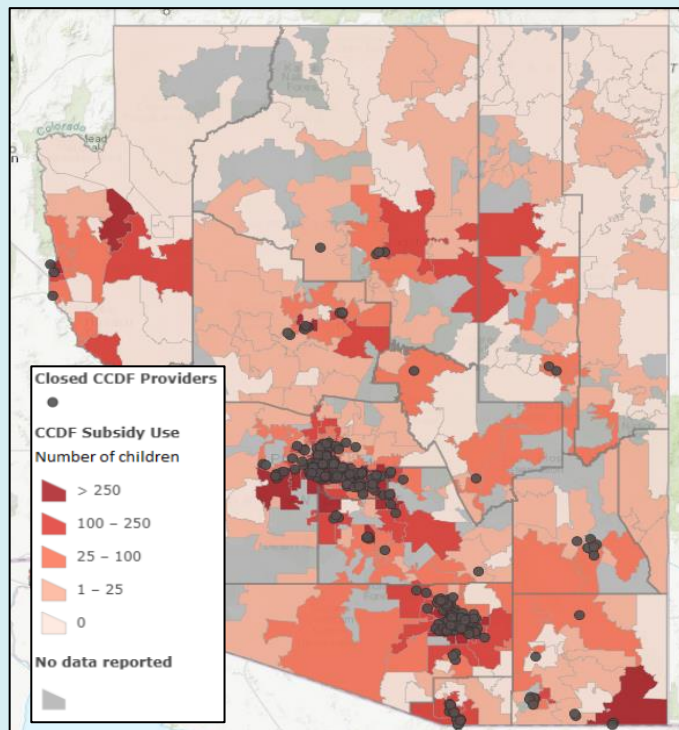
- Their goals for creating maps, including how policymakers used the maps to make decisions about CCEE access,
- How they engaged key partners, including the types of partners engaged, as well as how and when they engaged them in the process, and
- Lessons learned from using maps to support CCEE access, including advice they would give to others interested in using a CCEE map to make decisions.

What is a map “layer”?

Developers often create maps with multiple “layers” where each layer contains unique geographical information. For example, a layer can pinpoint specific addresses. Or a layer might use different colors to help individuals visualize data. When using an interactive map, layers can be turned on or off to explore whether there are patterns across the layers.

There are two layers in the map shown here. The first layer presents information about whether the CCDF provider has closed. This is shown with a black dot. The second layer illustrates the number of children using CCDF subsidies. This is shown by different shades of red. By selecting to show both layers on the map, users see the extent to which provider closures are occurring more in communities with higher or lower subsidy receipt. Using these layers of information could help CCEE leaders make decisions around CCEE access, such as where to target resources to support CCEE providers before they close or to support the opening of new CCEE providers.

Source: [Mapping the Gap™ in Arizona](#)



Part 1. How to Use Maps to Understand and Improve CCEE Access

Our scan of existing maps about CCEE access revealed multiple ways that leaders can use maps to understand CCEE access and how this information can support decision making about CCEE access. In this section, we offer examples and considerations of four decisions that CCEE leaders can make about CCEE access: understanding policy effects at the local level, allocating resources, building supply, and supporting families. Although their maps can be and have been used for multiple purposes, we spotlight a map from our experts that aligns to each of the four decisions to exhibit how maps can be used for each decision. Finally, we provide recommendations for how leaders can engage partners throughout the process to ensure that maps are useful and accurate.

Policy Effects at the Local Level

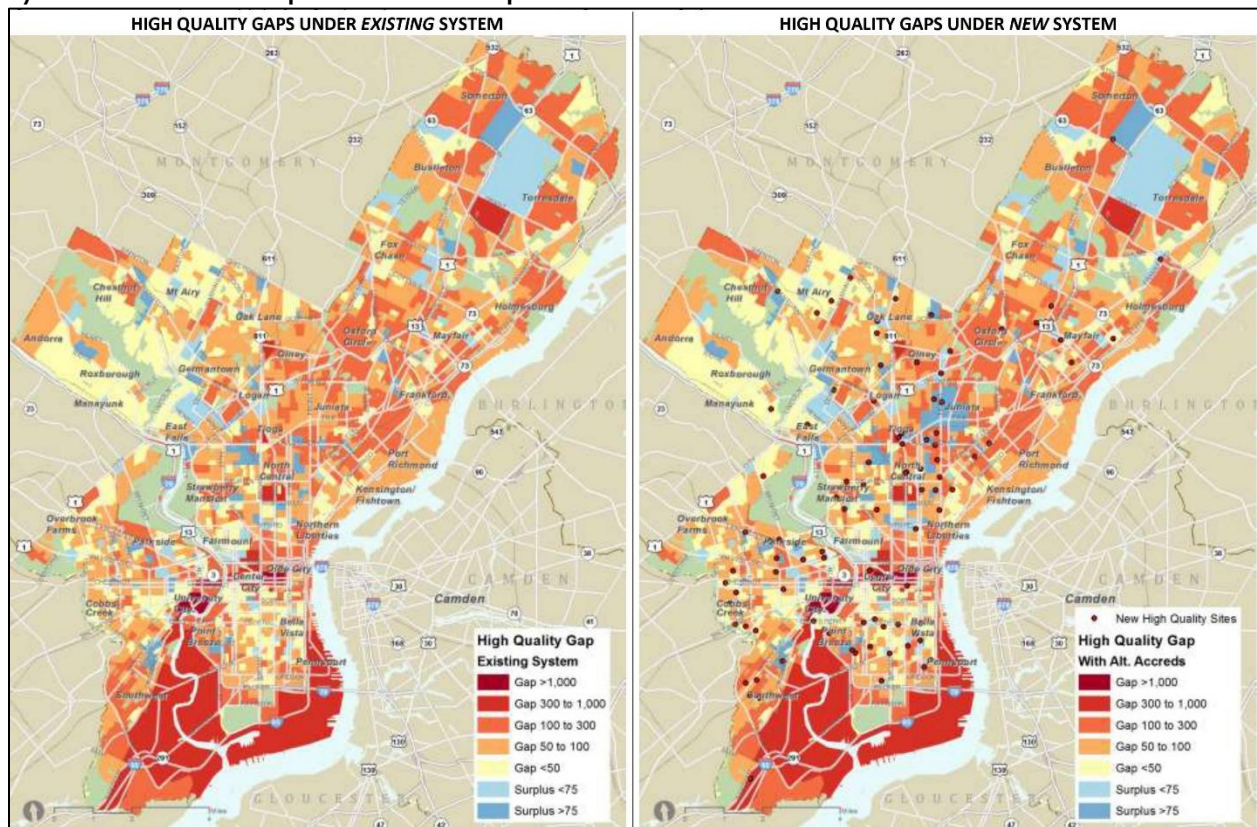
CCEE leaders can use maps to better understand how policies affect access differently in different geographies. By mapping this type of information, CCEE leaders can make data-informed policy decisions about how to improve access. The following hypothetical examples illustrate how CCEE leaders might use a map to understand how policies affect CCEE access at the local level.

- **Local implementation of CCEE policies.** When CCDBG was reauthorized, it included new requirements for annual health and safety inspections of license-exempt providers receiving child care subsidies. In response to these requirements, a state may ask local child care resource and referral (CCR&R) staff to conduct the inspections. One year later, state leaders may see a decline in license-exempt providers and wonder whether the decline is related to the new inspection requirement. To help answer this question, leaders can develop a map that plots the locations of license-exempt providers receiving subsidies. Then, they can color code each county to show the percentage of license-exempt providers who were out of compliance with 25% or more of the requirements. They can also color code each county to show the percentage of license-exempt providers who no longer receive child care subsidies. The state and county teams may use this information to target technical assistance supports for license-exempt providers.
- **Policy effects for target populations.** State CCEE leaders want to revise the criteria for which families should be prioritized for child care subsidies. They consider whether to prioritize families who receive Temporary Assistance for Needy Families (TANF). They create a map of the state that includes three layers of information at the county level: the number of families currently receiving TANF, the number of families with young children, and family income level. When all three layers of information are shown on a map, leaders can identify the counties that might benefit most from prioritizing TANF recipients for CCEE subsidies.
- **Policy effects for providers who serve children during nontraditional hours.** State CCEE leaders want to increase the number of providers who serve children during nontraditional hours (i.e., outside of the regular 9-5 Monday-Friday workweek). They want to identify a few counties where they could pilot an increased subsidy reimbursement rate for children who need nontraditional care as a strategy for building supply. To identify the counties, they create a map with the location of major employers that require employees to work second or night shifts. They then color code each county based on the number of families with young children. Finally, they pinpoint the location of providers in the county who are open outside of the 9-5 Monday-Friday workweek. By viewing the information from all three layers, CCEE leaders can select pilot counties with multiple employers who are open during nights or weekends, have more families with young children, and fewer providers who are open during nontraditional hours.

Map Spotlight: Philadelphia Child Care Map

In Philadelphia, the William Penn Foundation worked with the Reinvestment Fund in 2013 to develop an online mapping tool, [ChildCare Map](#), to support their early childhood investments (Figure 1). The map allows users to select various boundaries of interest (e.g., school districts, neighborhoods, legislative districts) and layers (e.g., child care supply, child care demand, race and ethnicity, transportation accessibility). The William Penn Foundation and the Reinvestment Fund teams were especially interested in identifying areas where families could not easily access high-quality CCEE. They were able to identify these underserved areas by mapping data on both the supply of and demand for CCEE. The [Fund for Quality](#) was established in response to these maps to address the financial impediments to growing high-quality supply in neighborhoods with low-income families and children of color. Additionally, they mapped how changes to the state's quality rating and improvement system (QRIS) rating system could impact the gaps in high-quality supply in underserved areas. The map in Figure 1 compares the gap in high-quality CCEE between current and revised standards. Reinvestment Fund's approach has been replicated in Atlanta, the District of Columbia, and counties across Western Pennsylvania and Northern New Jersey.

Figure 1. Estimated Gaps in Supply of High-quality Child Care Under the Existing and New Rating Systems on the Philadelphia ChildCare Map



Source: [Understanding How Changes to Keystone STARS Ratings Will Affect Gaps in the Supply of High-Quality Child Care \(2017\)](#)

Considerations for using maps to understand CCEE policy effects

Below are some guiding questions CCEE leaders can ask when using maps to assess policy effects on CCEE access at local level:

- What is the best geographical boundary to include in a map? For example, if the policy of interest was passed by the state legislature, then it may be helpful to designate legislative districts on the map.
- If CCEE leaders and partners are interested in understanding the implications of policy changes for subgroups of providers, families, or children, can the map include information about the subgroups of interest? Can the map, for example, identify CCEE providers in communities with a high proportion of Black residents? Or identify providers in communities with a high proportion of families earning incomes below the federal poverty level?
- Can the map help users understand how policy implementation changes over time? Are the data available over time? Will there be resources to update the map at future timepoints?

Allocating CCEE Resources

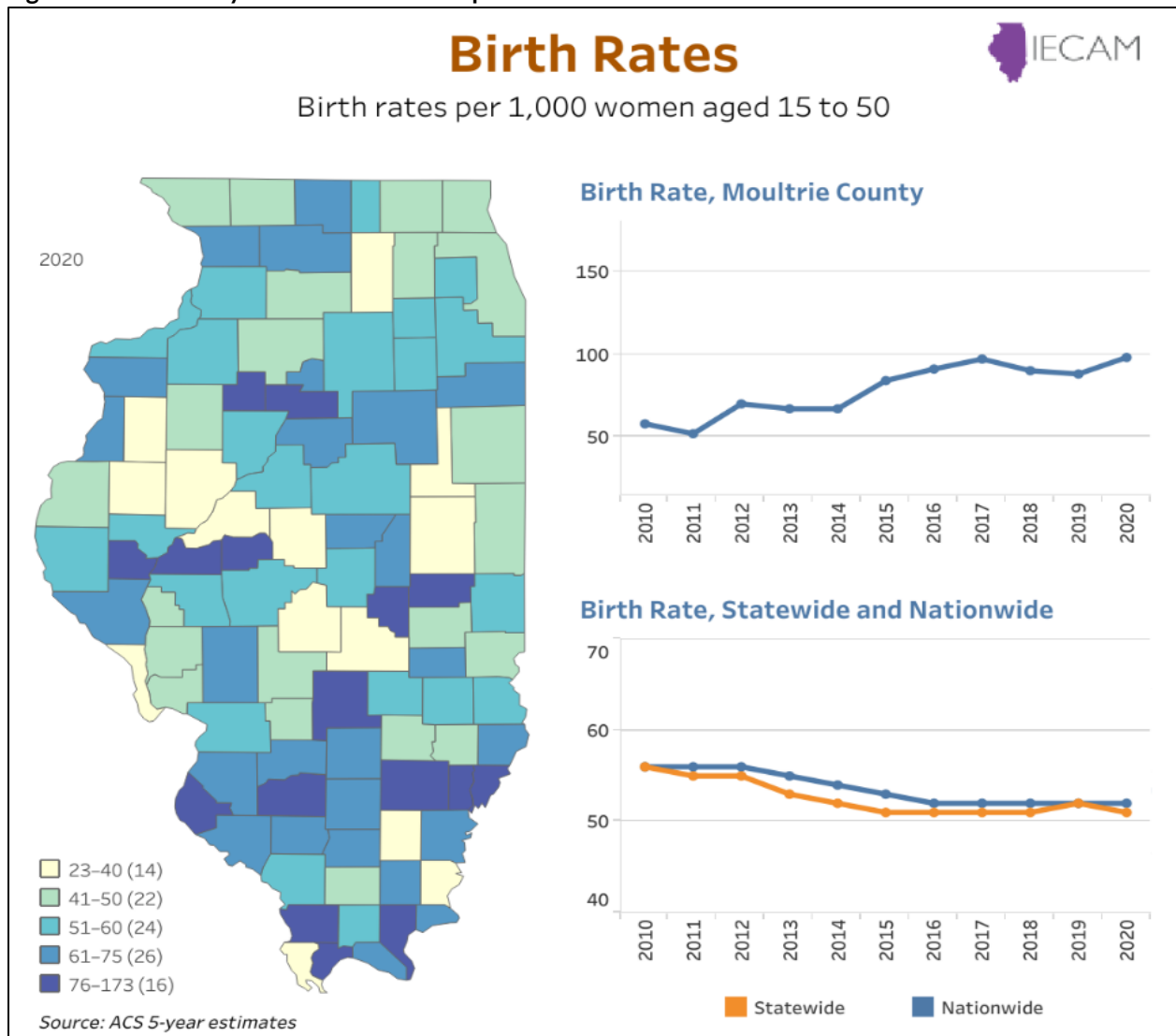
Maps can also help CCEE leaders make decisions about how to allocate resources equitably to local communities. The following hypothetical examples describe how CCEE leaders could use maps to make decisions about allocating resources to improve CCEE access.

- **Funding additional supply of CCEE slots.** A foundation offers grant funding to improve CCEE access in a large city by increasing additional infant-toddler CCEE slots. First, CCEE leaders map information about the number of infants and toddlers in the city to understand potential demand. Then, they add information about the number of available infant and toddler slots. By plotting both pieces of information, they can identify which neighborhoods have larger gaps between supply and potential demand. The grant funds are then given to these neighborhoods to increase the supply of infant-toddler care for those who may need it most.
- **CCEE quality improvements.** A state administrator has enough funding to hire four consultants who will work with CCEE providers to improve quality. The administrator needs to assign consultants to one of four regions in the state. They initially plan to create four regions that are similar in size. However, they decide to create a map that displays each town's urbanicity, the highways that access these areas, and the number of licensed CCEE providers within each town. After looking at the map, they decide to create regions of varying size that account for clusters of providers across urban and rural areas. This approach would minimize travel and balance caseloads across the consultants.

Map Spotlight: Illinois Early Childhood Asset Map

In 2006, several Illinois-based foundations and the Early Learning Council funded the University of Illinois at Urbana-Champaign to develop a map to help CCEE leaders determine where additional resources were needed (e.g., pre-K expansion). The [Illinois Early Childhood Asset Map \(IECAM\)](#) provides graphs, maps, and reports on a range of topics, including access, coordination, quality, workforce, and economic security in Illinois. Initially, these maps were developed to support transparency around how the state and funders could make decisions about the amount of funds necessary to fully fund universal pre-K. Now, these maps have been used by leaders across multiple sectors to support transparency in decision-making. For example, the map in Figure 2 shows birth rates by county for a single point in time (2020) as well as graphs to show birth rate trends over time (2010-2020). Counties are color coded on the map to identify different ranges of birth rates. A map like Figure 2 could help CCEE leaders prioritize quality support for providers who serve infants and toddlers or plan for future expansion of Head Start and pre-K slots in the counties with high birth rates.

Figure 2. Illinois Early Childhood Asset Map



Source: IECAM [Birth Rates and Characteristics](#)

Considerations for using maps to inform decisions about allocating resources

We have listed below questions for CCEE leaders and teams to consider when using maps to make decisions about allocating resources.

- What disparities or inequities currently exist in how resources are allocated? How can maps help people visualize and make sense of these disparities or inequities?
- Which CCEE providers are eligible to receive resources? How can they best be represented on the map? How should the team engage CCEE providers to inform the development of the map?
- What resources are provided by other partner organizations or networks? Would it be more helpful to present the location where families travel to receive services or the organization's catchment areas?
- How often will allocation decisions be made? Can the map be updated frequently enough to inform those decisions?

CCEE Supply Building

CCEE leaders can use maps to inform decisions about building the supply of CCEE. The following are hypothetical examples of how maps help CCEE leaders make these types of decisions.

- **Establishing regional hubs to promote supply building.** A state's licensing staff want to create eight regions to promote supply building. To identify these regions, state CCEE leaders create a map to note areas with the highest concentration of new providers. They include one layer to show the location of new licensing applications and another layer to show providers who have been licensed for less than three years. Using this information, state CCEE leaders create eight regional hubs for consultants to provide additional technical assistance for providers who are becoming licensed or were recently licensed.
- **Developing collaborative partnerships to increase supply for vulnerable populations.** A state has proposed plans to prioritize CCEE subsidies for children experiencing homelessness. CCEE leaders want to develop a collaborative network of community partners to better serve this population. They develop a map that includes layers for: the number of children estimated to be experiencing homelessness in each county, the location of CCEE providers, and the location of homeless shelters. Using this information, they identify counties with an insufficient number of licensed providers to serve children experiencing homelessness. They also identify CCEE providers near existing homeless shelters and invite both entities to participate in a special grant project.
- **Building the supply of high-quality CCEE.** A state is interested in expanding the number of high-quality slots for young children. They create a map that includes the location of high-quality CCEE options, which they define as: licensed providers participating in their QRIS, existing pre-K sites, or Head Start programs. They also include a layer to show zip codes with families of young children who have incomes below the federal poverty line. After identifying zip codes with the lowest incomes and fewest high-quality CCEE options, the state initiates a targeted marketing campaign to recruit providers to join a new quality improvement initiative.

Map Spotlight: Oregon

The [Oregon Child Care Research Partnership](#) has worked closely over the years with their state CCEE leaders to create maps that highlight CCEE supply data in various reports. In recent years, Oregon's CCDF administrators created maps to examine gaps in the demand for and supply of regulated, publicly funded CCEE. They provided this information to legislative committees as part of a request for additional supply-building funds. Figure 3 shows two of these maps, one for infants and toddlers and another for preschoolers. Each map color codes counties based on the percentage of regulated, publicly funded slots, demonstrating that there are fewer publicly funded slots for infants and toddlers than for preschoolers.

Figure 3. The percentage of publicly funded slots is greater for children 3-5 years than 0-2 years.



Source: [Oregon's Child Care Deserts: Mapping Supply by Age Group, Metropolitan Status, and Percentages of Publicly Funded Slots \(Map 7\)](#)

Considerations for making decisions about building CCEE supply

We include questions for CCEE leaders and teams to consider when using maps to help make decisions about improving CCEE services:

- Which local service providers could be invited to join the team to help create the map? Which service delivery staff should provide advice throughout the map creation process?
- What administrative data could be included in the map to help users understand the service and who receives the service?
- If interested in examining quality improvement, how is that defined? And what data are available to include in the map?
- Are there other similar services that should be represented on the map, to help inform decision making?

Supporting Families' CCEE Decisions

CCEE leaders can develop maps to assist families in choosing a CCEE provider for their young children. The following are hypothetical scenarios of how CCEE leaders can do this.

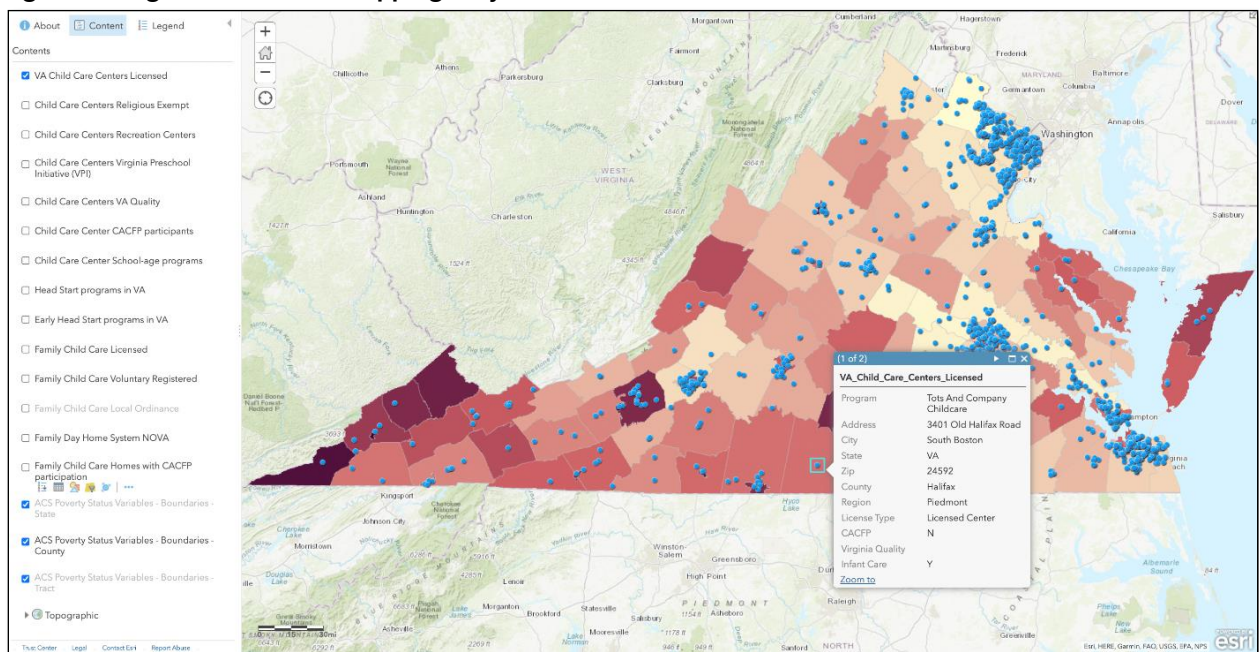
- **Family search for CCEE.** Within a city where families often commute for work, CCEE leaders want to help families find CCEE providers in areas that meet their needs—whether they want to use providers near their home or workplace. The city created a map so that families could see where providers are located alongside road and transportation lines.
- **Outreach efforts for CCEE.** CCEE leaders are interested in exploring new ways to reach Spanish-speaking families to enroll in the CCEE subsidy program. They would like to air radio ads in areas with high Spanish-speaking populations. Using an existing CCEE map that identifies areas with a high

proportion of Spanish-speaking families with children under 13 years, CCEE leaders can overlay the location and coverage of radio stations to determine where to buy airtime for outreach ads.

Map Spotlight: Virginia Child Care Mapping Project

The [Virginia Child Care Mapping Project](#) was created in 2014 by Grace Reef in collaboration with Child Care Aware Virginia to provide the public with information about the availability of different types of CCEE programs (e.g., licensed centers and family child care homes, registered family child care homes, religious license-exempt centers, Head Start, and school-age). The maps have been updated annually. Families can use the maps to find CCEE providers in their area, and policymakers can use the maps to better understand the distribution of providers across the state. Figure 4 shows an example map that is intended to assist families in finding regulated care options. It can also help policymakers understand where regulated care options are most and least prevalent in the state.

Figure 4. Virginia Child Care Mapping Project



Source: [Virginia Child Care Mapping Project](#)

Considerations for using maps to help make decisions about family support

CCEE leaders may ask the following questions when using maps to make decisions about supports for families when choosing CCEE providers.

- How can map developers gather feedback from families to learn about the most important features to display in a map designed to help them find CCEE providers?
- What additional information should be included in the map to support families in searching for CCEE providers? Is it possible to include highways and roads or information about public transportation? Is it possible to include information about provider costs, hours of operations, or age groups served?
- Are there particular subgroups of families who may have more difficulty accessing CCEE services? How can map developers tailor the maps to these families to ensure that their needs are met?

Engaging Partners to Prioritize Decision-Making

As CCEE leaders determine which decisions they want to make with maps, they should also consider how to engage partners meaningfully in the process of prioritizing the types of decisions they may want to make. Engaging partners early and often can also ensure that the map and subsequent decisions made from the map will meet users' needs. CCEE leaders will want to engage map developers (i.e., technical staff who will create the maps) and end-users (i.e., individuals who will use the map once finalized to make decisions). Table 1 includes a comprehensive list of potential partners that can provide valuable perspectives in the mapping process.

Table 1. Examples of partners to involve when creating maps to support decision making

Perspective	Example Partners
Families of young children	<ul style="list-style-type: none"> • Families with children in various setting types • Families using license-exempt care • Families with specific backgrounds
CCEE administrators	<ul style="list-style-type: none"> • Child care subsidy administrators • Head Start administrators • Public pre-K administrators
CCEE providers	<ul style="list-style-type: none"> • CCEE providers across setting types • CCEE franchising organizations • Students in Early Childhood degree programs
Community organizations that support children and families	<ul style="list-style-type: none"> • Child care resource and referrals • Non-profits (e.g., United Way or YMCA) • Community centers • Libraries
Business community	<ul style="list-style-type: none"> • Chambers of Commerce • Better Business Bureau • Community businesses (e.g., banks, hospitals, other large employers)
State and local CCEE policy leaders	<ul style="list-style-type: none"> • Child care advocacy organizations • QRIS administrators • Child care licensing staff
Other state and local leaders	<ul style="list-style-type: none"> • Other early childhood administrators (e.g., home visiting or early intervention) • State agency staff, especially those with previous mapping experience (e.g., department of health, department of natural disasters) • Longitudinal data system managers
Legislators	<ul style="list-style-type: none"> • Congressional representatives • State and local legislators and staff • Governor's office staff
Funders	<ul style="list-style-type: none"> • Foundations • Federal agencies (e.g., Administration for Children and Families)
CCEE researchers	<ul style="list-style-type: none"> • Researchers with CCEE content expertise • Researchers with mapping or geospatial expertise

CCEE leaders should determine how they want to engage these partners in the development process both for how they gather input and their engagement strategies.

- **Allow users to provide meaningful input.** Map partners can be helpful in providing contextual information about marginalized subgroups, historical events, the quality of the data, or other local initiatives and organizations that are critical for interpreting the maps. For example, maps intended to help families find CCEE may plot the specific addresses of providers. Provider-level information about rates and quality of care might also be added to help families make decisions. Talking with parents throughout the process will ensure that the final map includes the information they need to choose CCEE. Alternatively, maps intended for legislators might need to aggregate information across CCEE

providers within legislative districts. Legislative staff can provide important feedback to ensure that the map will meet their needs.

- **Develop a process for tailored engagement.** CCEE leaders should identify the most effective format for inviting users and partners to give input. For example, leaders may create a taskforce with diverse representation for discussions; ask individuals to participate in one-on-one discussions; or solicit written feedback. Given historic and systemic power imbalances, CCEE leaders will want to understand which engagement methods fit individual preferences and styles for intended users and partners, such as utilizing facilitation techniques in group discussions or offering multiple methods for offering input.

Part 2. Technical Considerations for Mapping CCEE Access

In this section, we describe several technical considerations for developing a map to inform decisions about CCEE access. These considerations are organized into three areas: selecting the appropriate data to include for ease of decision-making, choosing an analytic approach that supports decision-making, and displaying map contents to support decision-making.

Selecting the appropriate data to map

As noted earlier, our initial search for maps yielded 75 examples of how states, territories, and localities display CCEE access on a map. As we reviewed these maps, it was clear that the maps vary greatly in terms of what data they present. For example, maps included a mix of publicly available data (e.g., Census data), administrative data (e.g., CCEE licensing data), proprietary data (e.g., CCR&R data) or new data collected directly from CCEE providers (e.g., survey data about which age groups they prefer to serve). In this section, we highlight key considerations for how to determine which data to include:

- **Work closely with data managers.** Data managers are those who prepare and organize the data to be included in the map. By including data providers in the development process, they can share valuable information about the quality of the data, whether data are appropriate for supporting the intended decision, and how to maintain the privacy of individuals represented in the data. Including data managers also builds their capacity to use the map once it is developed.
- **Consider how the type of CCEE settings included in a map influences the kinds of decisions that can be made.** Including information on multiple CCEE settings (e.g., licensed centers, family child care homes, license-exempt providers, pre-K, or Head Start) allows CCEE leaders to make decisions across a spectrum of settings. Decisions about a subset of CCEE settings will be best applied to those settings and not generalized across all types of CCEE.
- **Consider whether data are available for subgroups of interest.** If CCEE leaders are interested in understanding or visualizing data for subgroups of populations, rather than the full population, it will be important to determine whether data can be disaggregated by these subgroup(s) of interest. For example, if CCEE leaders are interested in understanding the location of Black-owned CCEE settings or providers who speak Spanish, then they should determine whether those characteristics are represented in available data sources. For some subgroups of interest, teams might be able to apply publicly available data from the Census or American Community Survey to identify community subgroups. However, many historically marginalized communities may be underrepresented in large datasets.
- **Consider what level of detail to display in the map.** Sometimes, using more specific data may allow CCEE leaders to understand CCEE access more accurately on a map; however, using individual data may lead to privacy concerns if these individuals do not want to be identified. When creating maps,

CCEE leaders will need to make decisions about whether to present information at an individual level (e.g., specific address) or aggregate level (e.g., by averaging characteristics for a zip code, town, city, county, school or legislative district, state, or another region). When deciding what level of aggregation to present, map developers should consider what is possible based on the data source structure, what will support decision making, and how to protect the privacy of individuals whose data are represented on the map.

- **Consider including key contextual information.** Families base their decisions about CCEE on a variety of factors—such as the cost of CCEE, its quality rating, its proximity to the workplace, and culture/language match. It is important that map developers consider ways to incorporate such information into their mapping efforts to accurately understand access gaps. For example, developers can sometimes include map layers that showcase survey data from CCEE providers, which could include information about culture or language. Or developers can sometimes incorporate Census or transportation data that highlight roads, transportation information, and other key factors that might influence family decision making.
- **Anticipate how the data and map might change over time.** Map experts highlighted the importance of acknowledging that changes will happen over time. For example, CCEE leaders may be confronted with changes related to the availability of data, definitions of data, or policies. Map experts suggested that CCEE leaders periodically review maps and make needed adjustments. At the beginning of the map development process, it may be helpful to discuss plans for updating data presented in the maps and ask data providers about anticipated future changes in how data are defined, collected, or stored.

Choosing how to analyze available data

CCEE leaders and their teams must make decisions about whether and how to analyze data before presenting information on maps.

- **Determine whether analyses are needed.** In some instances, CCEE leaders and their teams can use data without conducting additional analyses. For example, the map in Figure 4 above simply uses address data to display the location of various types of providers. Teams can also present on maps findings from more complicated data analyses. As part of the Preschool Development Grant B-5, for instance, [New Hampshire](#) leaders analyzed multiple sources of data (e.g., location of providers, location of families with young children within a geographical area) to create and map an overall access score that indicates the extent to which slots were available within a 20-minute drive of families across different areas of the state.
- **Weigh the pros and cons of running analyses.** When choosing whether to analyze data to create new information for the map, CCEE leaders can consult with geospatial experts to discuss tradeoffs related to the complexity of the analysis, the ease of interpretation, and the resources or expertise needed to conduct analyses. Additionally, CCEE leaders and their teams can consider whether they should analyze data before including on the map or whether they can leverage mapping software features that allow them to do basic analysis to create visual distinctions (e.g., patterns or different colors). Additional resources are also listed at the end of this brief.

Displaying map contents to support decision making

It is important that map developers consider best practices for presenting the data on maps, especially to prioritize the accessibility of how information is displayed. We offer several considerations for how map developers can display information on maps so that users can interpret and use the information appropriately.

- **Decide between an interactive or static map.** A key advantage of an interactive map is that it allows users to explore their own questions. Users can zoom in or out. They can also turn layers on or off. When these interactive maps are online, it offers the public an opportunity to explore questions of their own. However, online interactive maps require ongoing resources to ensure that the information

remains current. Alternatively, static maps are standalone images that are often used in reports or briefs and do not require ongoing resources to maintain. Static maps give map developers the control over which findings to showcase as well as how many and which layers to present.

- **Define terms.** Definitions help ensure that everyone has a shared understanding of the data elements included in a map. Definitions can be included in the legends. For example, if map developers develop a map that delineates “high quality” providers, it would be important to define what data and thresholds were used to determine high-quality designations (e.g., 4- or 5-star rating in a QRIS).
- **Keep the map as simple as possible.** Maps can be powerful tools for presenting multiple data sources at once. However, combining multiple data sources can be complicated and confusing. For example, when creating static maps, map developers should limit the number of data elements and layers on the map. They should also think about how to best convey important information, so it does not get lost.
- **Carefully consider colors, fonts, and icons.** Because a map is a visual tool, the font, colors, size of icons or images, and accessibility considerations are important to clearly convey the message(s) as intended. Map developers can work with communication or marketing experts to understand how best to visually display information in a map. For instance, accessibility standards may encourage the use of patterns (e.g., stripes or dots) to differentiate areas of interest than the use of color spectrums. Or when colors are used, selecting colors with high contrast will support accessibility. More guidance on design options can be found in the [Additional Resources](#) section.
- **Offer training or other guidance for using maps.** When developing maps for internal decision-making, agency staff may need training on how to navigate maps and interpret them. When developing maps for the public, it may be helpful to host instructional webinars that can be recorded and posted for future use. Manuals and training guides may also be helpful. Map developers can also offer example text to demonstrate what the map can and cannot do and how the map should and should not be used.

Summary

Location matters, and a map can be a powerful tool to visually portray information to help CCEE leaders make decisions and support families. A map can inform a range of CCEE access-related decisions including allocating resources, policy implementation or changes, improving services, and supporting families. There are limitations to maps, though. Including too much information on a map can be overwhelming, and data may not align well with the intended purpose. It is important to engage a broad group of people when developing a map, including those who know the data well, understand the programs and services, will be the future users of the map, and who are represented in the data (e.g., CCEE providers or families of young children). Starting the mapping process by articulating the purpose of the map and identifying the intended user will help ensure that the map is useful in supporting decisions to strengthen services for young children and their families.

Additional Resources

The following resources may be helpful to CCEE leaders and their team when considering what approaches and strategies to use to support decision-making. This list offers examples of resources; it is not exhaustive.

Resources on Developing or Designing Maps for Child Care and Early Education Contexts

- Administration for Children and Families (ACF) Digital Toolbox: Maps: <https://www.acf.hhs.gov/digital-toolbox/drupal/content-types/maps>
- Centers for Disease Control and Prevention (CDC) Map Making Resources: <https://www.cdc.gov/gis/map-making-resources.htm>
- State of Minnesota Map Design Guide Best Practices Ensuring Accessibility/Usability: https://mn.gov/mnit/assets/map-design-guide_tcm38-375673.pdf
- ColorBrewer from The Pennsylvania State University to evaluate color schemes in maps: <https://colorbrewer2.org>

Resources Applying Spatial Analysis in Child Care and Early Education Contexts

- Azuma, J. T., DeBaryshe, B. D., Gauci, K. T., & Stern, I. R. (2020). Mapping Access to Affordable Early Childhood Education and Care: Methodology and Application to Community Advocacy. *Int. Journal of Com. WB*. <https://doi.org/10.1007/s42413-020-00096-1>
- Davis, E., Lee, W. F., Sojourner, A. (2018). Family-centered measures of access to early care and education. IZA Institute of Labor Economics. Discussion Paper No. 11396. <http://childcareaccess.org/methods/>
- Davis, E., Lee, W. F., & Sojourner, A. (2019). Family-centered measures of access to early care and education. *Early Childhood Research Quarterly*, 47, 472-486.
- Klein S. (2011). The availability of neighborhood early care and education resources and the maltreatment of young children. *Child maltreatment*, 16(4), 300–311. <https://doi.org/10.1177/1077559511428801>
- Lin, V. & Madill, R. (2019). Incorporating Spatial Analyses into Early Care and Education Research. OPRE Research Brief #2019-88. Washington, DC: Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services. https://www.acf.hhs.gov/sites/default/files/documents/opre/cceepra_spatial_analysis_508.pdf
- Malik, R., Lee, W.F., Sojourner, A., & Davis, E.E. (2020). Measuring child care supply using the enhanced two-stage floating catchment area method. Washington, DC: Center for American Progress. <https://americanprogress.org/wp-content/uploads/2020/06/Child-Care-Deserts-Methodology.pdf>

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