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New Hampshire's Early Childhood System in the Time of COVID-19:

Child Care Access and Regional Systems Coordination

October 2021

Introduction

With the emergence of the COVID-19 pandemic, many early care and education providers are struggling to stay open. Some have even closed their doors for good, due to financial, staffing, and/or health-related challenges. In New Hampshire, data from the early months of the pandemic suggest that most licensed child care programs closed at least temporarily. For those that reopened, many are still operating with limited capacity.¹ Such trends have generated strong interest among policy makers in New Hampshire and across the country in how the pandemic is affecting access to child care and the extent to which access has decreased and/or shifted.

One key goal of the New Hampshire Preschool Development Grant Birth through Five (PDG B-5)² is to improve families' access to quality child care by building a coordinated, family-focused, mixed delivery system. In service of this goal, the New Hampshire PDG B-5 leadership expressed interest in mapping child care deserts in the state—i.e., communities with an insufficient number of child care slots to adequately serve the families with young children who live nearby. PDG B-5 resources support families with children ages birth to eight in New Hampshire. For the purposes of this brief, “child care” is defined as a licensed family child care or center-based program that cares for young children before kindergarten entry.³

The COVID-19 pandemic has also highlighted the importance of collaboration and coordination between state agencies and local partners to strengthen and sustain early care and education services and promote positive family outcomes. To this end, New Hampshire is using PDG B-5 funds to support a network of coordinated regional partnerships, known as the *New Hampshire Early Childhood Regions* (Exhibit 1). Lead entities in each region will provide input into state-level planning, coordinate local services, identify local service gaps, and facilitate efforts to address these gaps.

To support the state in this work, Abt Associates developed a series of maps—including static maps presented in this brief and an interactive online map⁴—for the University of New Hampshire

Online Interactive Maps

Interactive maps are available online via the [NH PDG B-5 website](#) (under New Hampshire's Regional Early Childhood system). When using the interactive maps, users can choose what information to present simultaneously (e.g., access scores, community characteristics). Users can also zoom in to explore specific regions and communities within the state.

¹ ESI Econsult Solutions Inc. & National Center for Children in Poverty. (2021). *Constraints on New Hampshire's Workforce Recovery: Impacts from COVID-19, Child Care and Benefit Program Design on Household Labor Market Decisions*. Author. Retrieved from: [PowerPoint Presentation \(nh.gov\)](#)

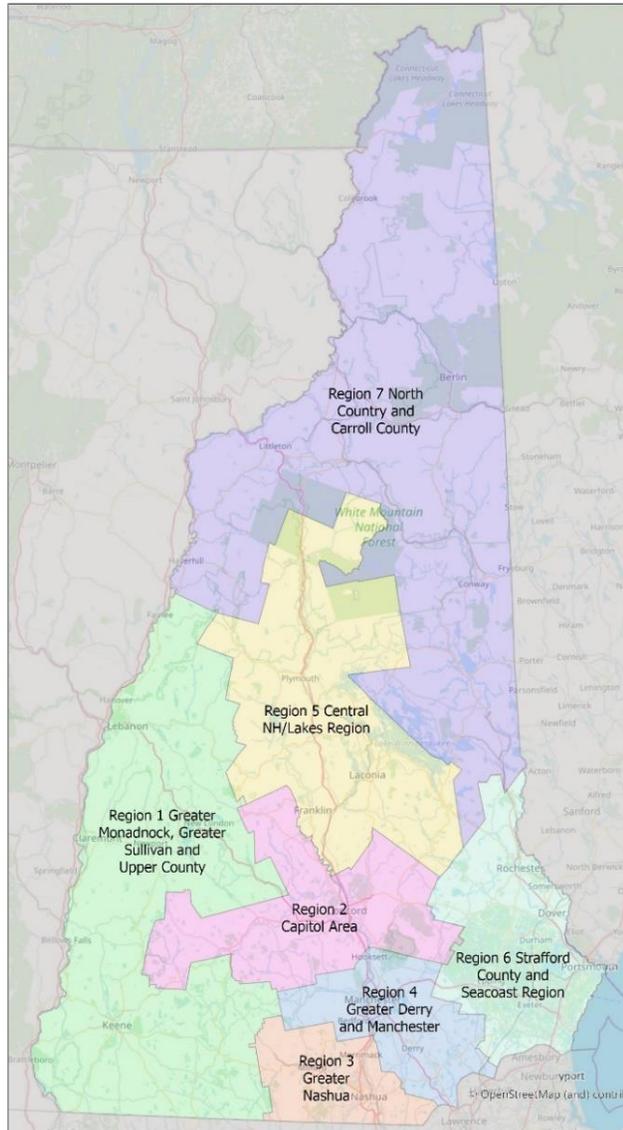
² This report was made possible through New Hampshire's PDG B-5 grant, which is sponsored by the Department of Health and Human Services, Administration for Children and Families (Award# 90TP0060-01-00). Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project.

³ Data in this brief are limited to licensed programs. We excluded some licensed programs—such as summer camps, park and recreation programs, or exclusively school-age programs—to focus on those programs that served regular child care to younger children. We recognize that informal/unregulated care is integral to the child care landscape, but we were unable to include such programs because the administrative datasets lack information about the number of children served within these programs.

⁴ Interactive maps can be found online at the New Hampshire PDG B-5 website: <https://mypages.unh.edu/pdg/>

PDG B-5 team in partnership with the New Hampshire Department of Health and Human Services, the New Hampshire Department of Education, and the Council for Thriving Children. The goals of this brief are twofold. First, we identify child care deserts in the Spring of 2021 by mapping information about the disequilibrium around the supply of and demand for licensed child care. Using ArcGIS pro, we plot “access scores” to illustrate the extent to which there is adequate child care capacity to serve families with young children. This work aims to build on and supplement other efforts to map aspects of supply and demand for child care in New Hampshire in a few key ways. First, we use recent data about whether a program is open or closed (from Spring 2021) to plot the location of child care deserts in the midst of the COVID-19 pandemic. Additionally, we use cutting-edge methodology to identify child care deserts, known as the *Enhanced Two-Stage Floating Catchment Area Method*.⁵ This methodology incorporates information about the distance families may need to travel to access care. Finally, it accounts for the availability of child care slots relative to the population of nearby families with young children who might also want to enroll in these programs.

Exhibit 1. New Hampshire Early Childhood Regions



A second goal of this brief is to share how geomapping informed state decision-making about the design of the New Hampshire Early Childhood Regions. As described in more detail below, our team supported the state’s Early Childhood System Development Workgroup⁶ by mapping office locations and catchment areas for 17 distinct systems that support families and children (e.g., family support services, home visiting services, child welfare services,

⁵ See Appendix A for a detailed description of data sources and methodological approaches used. See Appendix B for a detailed description of how we incorporated additional layers into the map to better contextualize the New Hampshire communities where child care deserts are located or may be emerging.

⁶ The Early Childhood System Development Workgroup included representatives from: The Department of Education and its Office of Special Education; The Department of Health and Human Services and its Division of Housing and Economic Stability, Bureau of Family Support Services, Bureau of Child Development and Head Start Collaboration, and Division of Public Health, Maternal and Child Section; and The New Hampshire PDG B-5B-5 staff. The National Technical Assistance Center for PDG B-5B-5, funded by the Administration for Children and Families within the U.S. Department of Health and Human Services, helped to facilitate the workgroup and provided expert consultation.

school districts, mental health supports). We also employed several ArcGIS analytic tools to help the state understand areas of overlap and identify coverage gaps. These maps, presented below and available online, can be used and potentially expanded upon to explore additional opportunities for cross-system collaboration.

The sections of this brief are organized as follows: **Section I** provides an overall snapshot of access to child care across the state. We then provide examples of how community-level contextual information can be used to better understand gaps in access, including disparities across different populations. **Section II** describes how geomapping helped to inform the creation of the New Hampshire Early Childhood Regions. The section also describes how child care access varies by region and identifies opportunities for how regional partners may use interactive maps to inform their work. The brief concludes with a summary of takeaways and additional lines of inquiry that may be explored in future geomapping efforts and analysis.

Major Takeaways

- Overall, access scores trended towards the lower- to middle-range. The statewide median access score in Spring 2021 was 0.34, suggesting there is about one licensed slot for every three children in New Hampshire within a 20-minute driving distance of a family home.
- Higher access scores tended to be concentrated in urban areas (e.g., Concord, Manchester, Portsmouth). Lower access scores tended to be concentrated in rural parts of the state (e.g., Coös County).
- Access varied across the newly defined Early Childhood Care, Education, and Family Support Regions. Families in Greater Derry and Manchester Region (Region 4) had the highest access scores, with about one slot for every two children. Families in Greater Monadnock, Greater Sullivan, and Upper County (Region 1) and Central New Hampshire/Lakes Region (Region 5) had the lowest access scores. Results suggest there was about one licensed slot for every four or five children in these regions.

Section I: Child Care Access in New Hampshire

In this section, we present an overall snapshot of child care access in New Hampshire. We estimated child care access by first generating “access scores” using the *Enhanced Two-Stage Floating Catchment Area Method*.⁷ We created two options for viewing information about access scores on the maps—one at the family-level and the other at the town- and city-level:

Legend for Family-Level Access Scores	Legend for Town- and City-Level Access Scores
● High Access (Score = 1+)	■ High Access (Score = 1+)
● Moderate, Above Median Access (Score = 0.34 - 0.99)	■ Moderate, Above Median Access (Score = 0.34 - 0.99)
● Low, Below Median Access (Score = 0.01 - 0.33)	■ Low, Below Median Access (Score = 0.01 - 0.33)
● No Access (Score = 0)	■ No Access (Score = 0)
	■ Low Population of Young Children

⁷ See Appendix A for a detailed description of data sources and methodological approaches used.

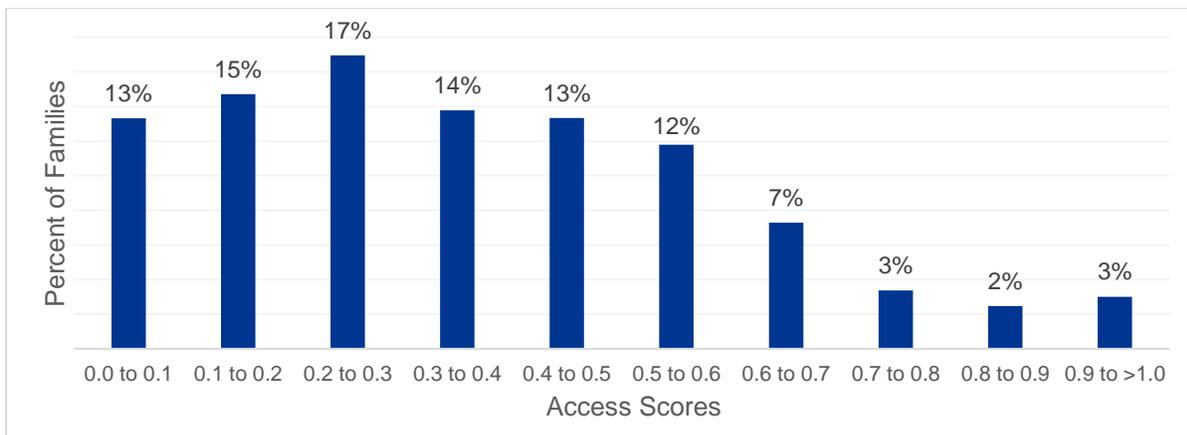
As shown in the **family-level** legend above, color-coded dots are used to indicate a family’s access score on the maps.⁸ A final access score of 0 (red) indicates that no licensed care options are available within a 20-minute driving distance of a family home. A final access score of 0.5 indicates that there is half a slot at a child care program available—in other words, only one slot for every two children at that address. A score of 1 or more (blue) indicates that there is sufficient or excess program capacity to accommodate all children in the family’s geographic area. For the purposes of color coding, we use the state median access score to distinguish between lower (yellow) and moderate (green) categories. Next, as shown in the **town- and city-level** legend, towns and cities are color-coded based on the median access scores for families living within the town or city. The color-coding scheme mimics that of the family-level access score with color-coded polygons representing the median access score for a particular town, as shown in the legend above. Again, we use the state median to distinguish between lower (yellow) and moderate (green) categories.

Families’ access to licensed child care varied considerably in the Spring of 2021, from an access score of 0 and to a score of 1 or higher. The median access score was 0.34, suggesting there is about one licensed slot for every three children in New Hampshire within a 20-minute driving distance of a family home. As shown in Exhibit 2 below, access scores trended towards the lower- to middle-range. About 13% of New Hampshire families with young children had access scores between 0.0 and 0.1, suggesting that these families have no or nearly no access to licensed care options within a 20-minute drive of their home. About 25% of families had access scores between 0.4 and 0.6, indicating that there is roughly one licensed slot for every two children within a 20-minute drive. About 3% of families had a score of 1 or more, indicating that there is sufficient or excess licensed provider capacity to accommodate all children in the family’s geographic area.

Access in New Hampshire

In Spring of 2021, there was about one licensed child care slot for every three children in New Hampshire within a 20-minute driving distance of a family home.

Exhibit 2. Distribution of Access Scores Across New Hampshire



⁸ Population-level data about families with young children were obtained from the Census and American Community Survey, which do not provide specific addresses for families. To map the access scores, we randomly assigned families to addresses within their Census block. To avoid any confusion for readers that we might be releasing sensitive information about families, we do not include the family-level access scores in the interactive online maps.

As shown in Exhibit 3 below, higher access scores tended to be concentrated in urban areas (e.g., Concord, Manchester, Portsmouth), as evidenced by the green shading. Towns and cities with the highest access scores included Grantham in Sullivan County (Median = 3.81), Peterborough in Hillsborough County (Median = 1.45), Harrisville in Cheshire County (Median = 1.41), and Colebrook in Coös County (Median = 1.23). As Exhibit 3 shows, lower access scores (evidenced by orange and red shading) tended to be concentrated in rural parts of the state, such as Coös County.

The maps below illustrate the average access score for a town or city. Exhibit 4 illustrates this for one urban area and one rural area—Manchester (Hillsborough County, southern New Hampshire) and Berlin (Coös County, northern New Hampshire), respectively. The Manchester map shows that access scores are generally greater in the city center (as indicated by clusters of green dots) and decline for families living farther from the city center (as indicated by the yellow clusters). The map for Berlin is much less populated and shows a greater mix of access—as indicated by hubs of green dots, as well as sprinkled red and yellow dots in surrounding areas.

Exhibit 3. Access to Licensed Child Care in New Hampshire

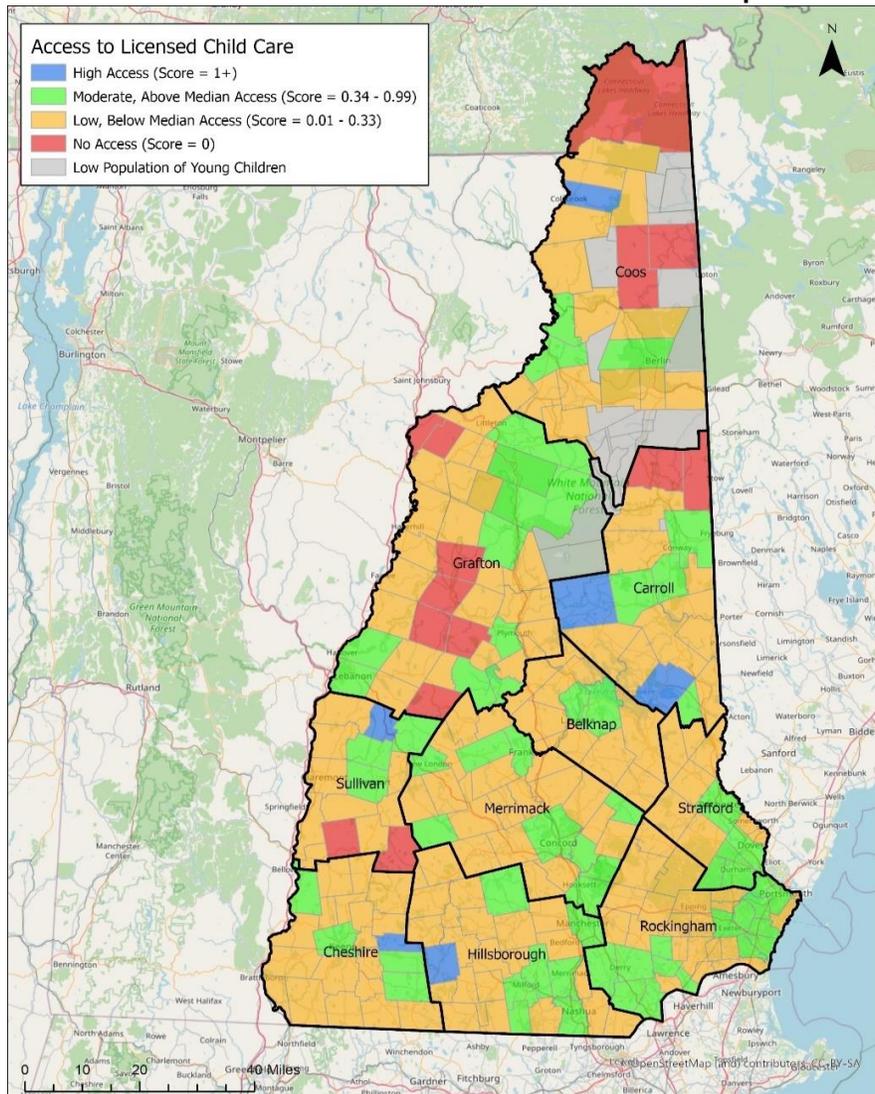
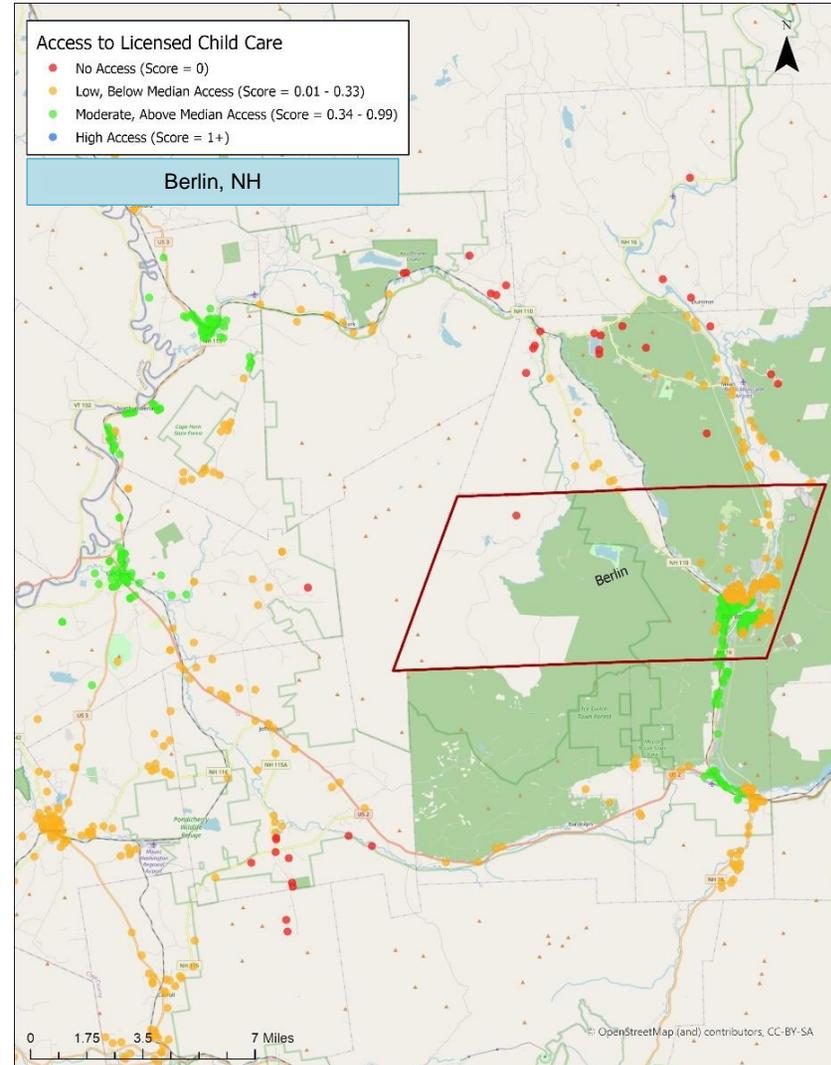
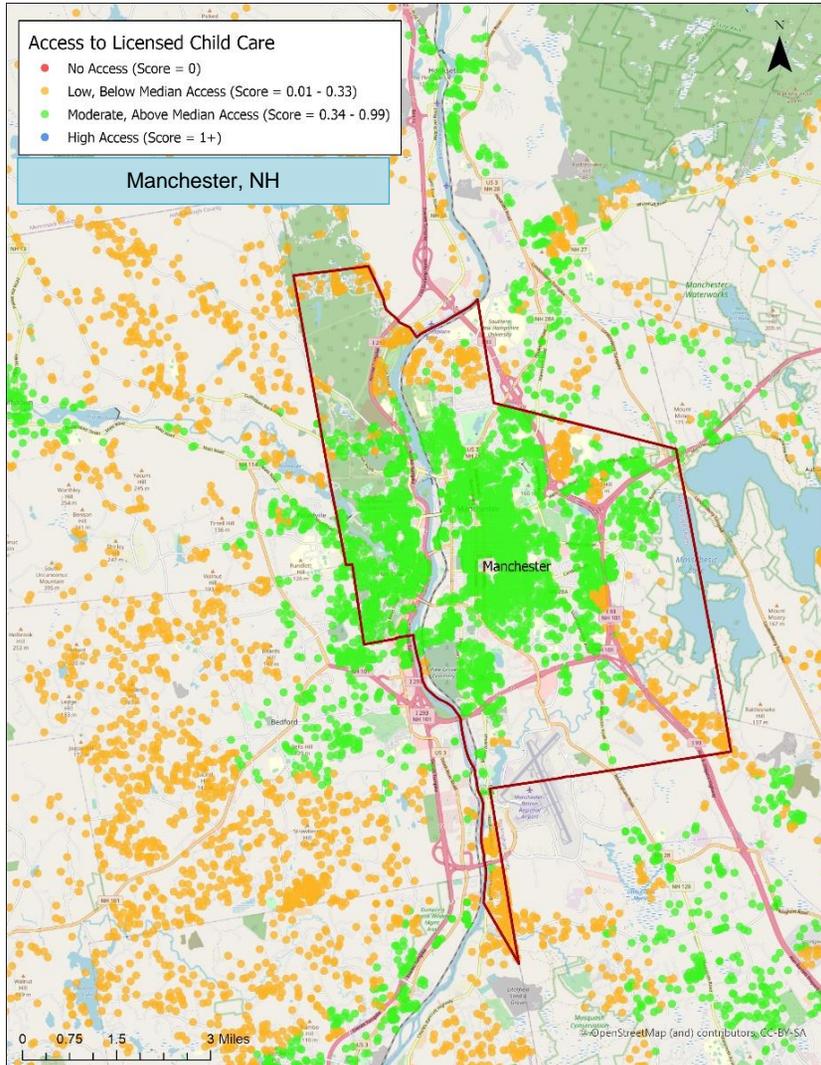


Exhibit 4. Access to Licensed Child Care for Families with Young Children in Manchester and Berlin



Contextualizing Access in New Hampshire

Community-level characteristics play an important role in understanding how and why access may vary. To facilitate a deeper understanding of how and why access varies across New Hampshire, the online interactive maps include additional layers for community-level characteristics such as child population, health care access, immigration status, limited-English household, poverty status, and race and ethnicity.⁹

The static map presented in Exhibit 5 offers an example that includes information about child poverty. As noted in the legend, pink shading is used to indicate moderate levels of poverty and purple shading is used to indicate high levels of poverty.

The Manchester map illustrates a clear trend. As indicated by the purple shading, the number of young children living in poverty is concentrated in the city center. This is also where families have higher access scores, as indicated by the green dots. Moving away from the city center, poverty levels drop, as do the families' access score.

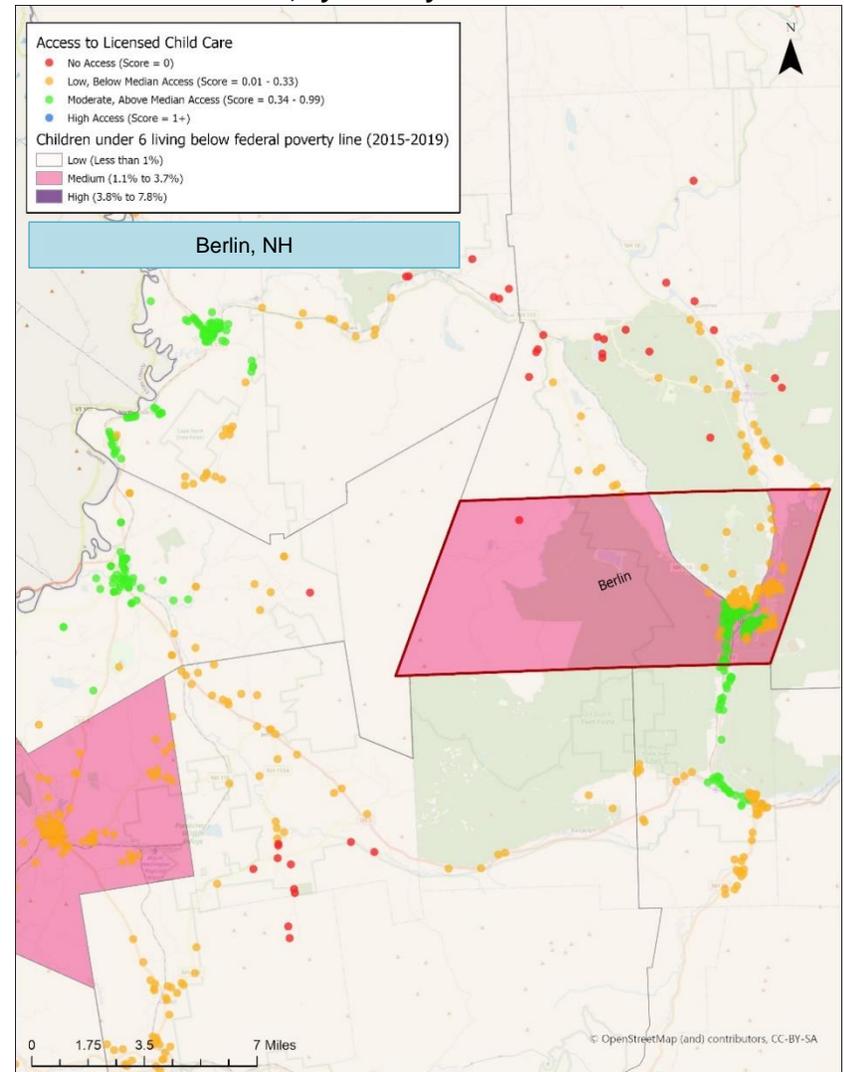
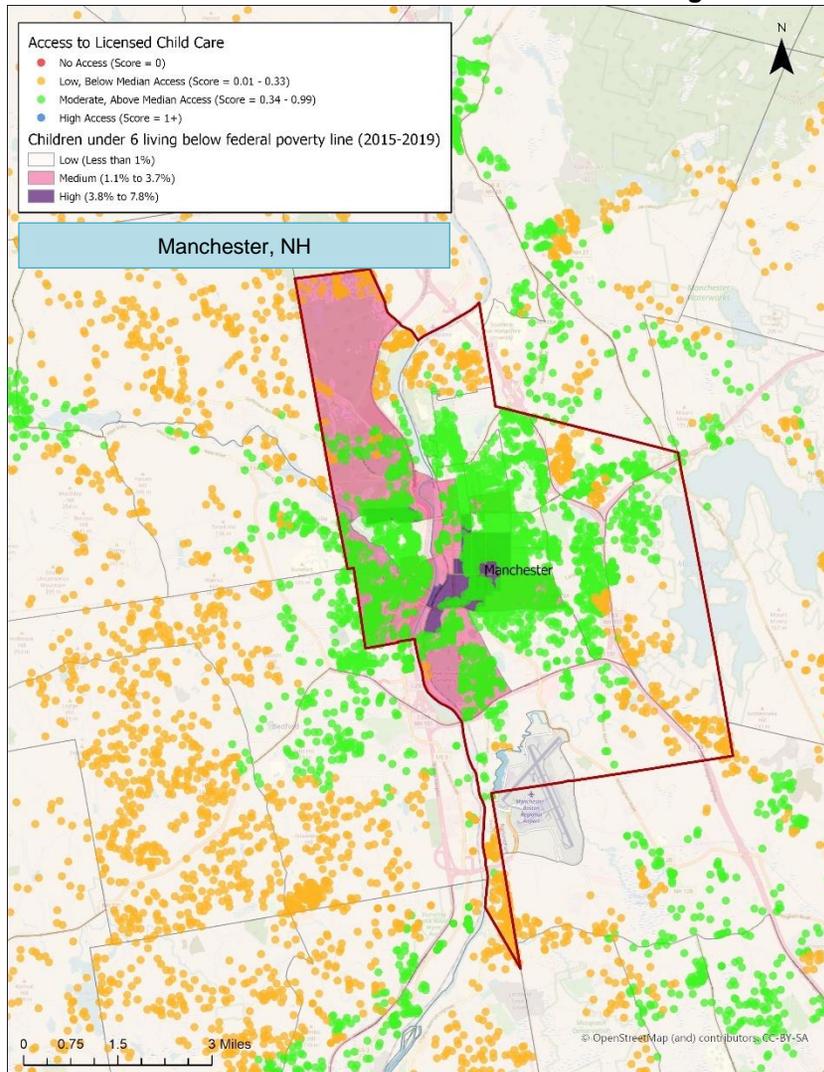
The Berlin map provides a more nuanced picture. For example, as indicated by the pink shading, the city of Berlin can be characterized as a community with a moderate level of poverty. Within the town borders, families have a mixture of low to moderate access to licensed child care (as indicated by the yellow and green dots, respectively). As one moves farther away from Berlin, the poverty levels tend to drop, yet access scores remain mixed. Some families have low to moderate access, yet many more families have no access to licensed child care (as indicated by the red dots).

An important consideration, which is not yet accounted for in these maps, is whether child care programs offer affordable and/or high-quality care. Recent data from Child Care Aware of America suggests that a two-parent, two-child family in New Hampshire living at the poverty line would have to pay nearly all (94%) of their household income for center-based child care.¹⁰ These figures underscore an important point—even though families may live in close proximity to multiple licensed child care programs without financial support; they may not be able to actually access the programs if the care is too expensive. As discussed below, future research may be helpful for exploring whether families who have high access scores and who live in high poverty communities truly have access to affordable and/or high-quality care options.

⁹ See Appendix B for detailed information about the data sources and definitions of each available contextual factor.

¹⁰ Child Care Aware of America (2019). *Price of Child Care in New Hampshire*. Author. Retrieved from: [New Hampshire.pdf \(childcareaware.org\)](https://www.childcareaware.org/new-hampshire)

Exhibit 5. Access to Child Care for Families with Young Children in Manchester and Berlin, by Poverty Level



Section II: Regional System Supports in New Hampshire

In the Spring of 2021, New Hampshire embarked on a process to design a new model of coordinated regional partnerships to promote the integration of systems to better support families with young children. Through these new regional partnerships, known as the New Hampshire Early Childhood Regions, the state aims to improve outcomes for children, families, and communities by:

- Improving and strengthening communication and collaboration within and between regions, and between the Regional Leads and DHHS and DOE partners;
- Reducing gaps and duplication in and between regions;
- Building regional capacity to identify community gaps and needs while equipping families to connect with needed services;
- Establishing an infrastructure that supports and engages a full range of community partners, including family members, schools, family support and early childcare and education programs; and
- Creating sustainable programs and long-term targeted strategies that include more efficient use of resources and funding.

To facilitate the formation of the regional partnerships, the state convened an Early Childhood System Development Workgroup. This workgroup included representatives from New Hampshire's Department of Health and Human Services and Department of Education, PDG B-5 staff from the University of New Hampshire, and staff from the National Technical Assistance Center for PDG B-5. Members met over the course of several months to discuss a range of design considerations for the new regional system. In the two sub-sections that follow, we first describe how geomapping was used to facilitate decision-making during the development of the new system. Then, we provide descriptive results about how access scores vary across the newly defined regions.

Using Maps to Design Regions

To help facilitate data-driven decision-making, the workgroup reviewed results from a statewide survey of early childhood stakeholders. The responses to the survey represent 207 organizations, schools, state partners, collaborations, coalitions, and individuals. The group also relied on interactive maps that were generated by Abt. To generate these interactive maps, our team first identified the locations and catchment areas for 17 early childhood and family support systems (see Exhibit 6 below). These systems, proposed by the workgroup, were wide-ranging and covered areas such as health, education, child care, and general family and early childhood organizations.¹¹ After plotting this information in ArcGIS, workforce members could interact with the maps to activate different system layers, pinpoint overlapping catchment areas for the most critical support systems, and identify potential coverage gaps.

¹¹ The workgroup provided the preliminary list of system supports to map. For some systems, such as New Hampshire's Family Resource Centers, we were only able to plot locations (not regions) because they do not strictly ascribe to particular catchment areas. Such decisions were informed by ongoing discussions with the workgroup.

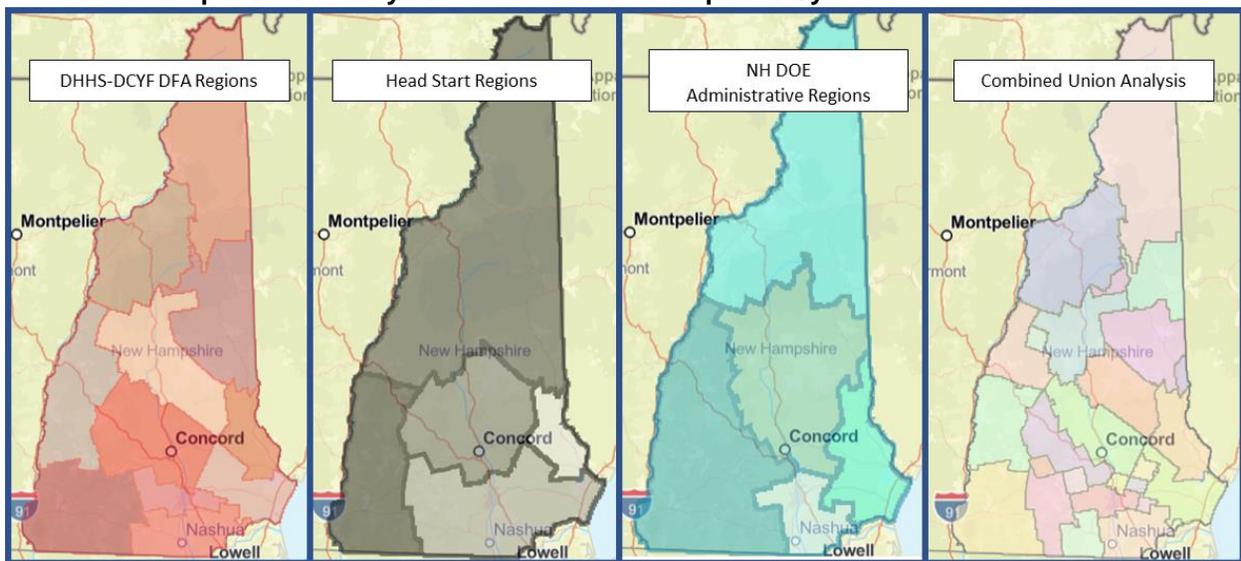
Exhibit 6. Regional System Supports in New Hampshire

System Support Name	Description	Information Mapped	Source
21st Century Community Centers	DOE's 21 st Century Community Centers focus on out-of-school time programming for expanded academic enrichment opportunities for children attending high poverty schools.	Offices	Correspondence with DOE Program Staff
Child Protective Services	DHHS's Child Protective Services works with families to assess the safety of children, identify needs, and develop a case plan to ensure the safety of children.	Offices	NH DHHS
Comprehensive Family Support Home Visiting Programs	The Comprehensive Family Support Services network provides home visiting services to pregnant women and families with children up to 21 years. Services promote family wellness and aim to decrease family stressors and child abuse and neglect.	Offices, Regions	NH DHHS
Developmental Service Area Agencies	DHHS's Bureau of Developmental Services provides early intervention, assistive technology, personal care, and other social services to individuals with developmental disabilities and acquired brain disorders.	Offices, Regions	NH DHHS
Bureau (Division) of Family Assistance	DHHS's Division of Family Assistance administers programs and services that provide financial, medical, and food and nutritional assistance, help with child care costs, and emergency help to obtain and keep safe housing.	Offices, Regions	NH DHHS
DOE Administrative Regions	The DOE administrative regions pool resources from multiple municipalities to provide an array of educational, developmental, and teaching supports for parents, students, and educators.	Regions	NH DOE
Family Resource Centers	Family Resource Centers promote parent education and wellbeing, as well as healthy child development, through a variety of services such as information and referrals, support groups, cultural and arts events, and more.	Offices	NH Children's Trust
Federally Qualified Health Centers	Federally Qualified Health Centers provide comprehensive primary care services to medically underserved and low-income populations.	Offices, Regions	SILO.TIPS
Head Start and Community Action Programs	Head Start is a federally funded program that provides child care to eligible low-income children between the ages of 3 and 5.	Regions	NH Division of Public Health Services
Healthy Families America	Healthy Families America family support specialists visit families in their homes to assist parents-to-be and parents of young children in the early stages of raising a family.	Offices, Regions	Correspondence with Program Staff
Integrated Delivery Networks	Integrated Delivery Networks deliver mental health, behavioral health, substance use disorder, and physical health services to the state's Medicaid recipients.	Offices, Regions	NH DHHS
Mental Health Regions	Mental Health Regions oversee Community Mental Health Centers that provide publicly funded mental health services to individuals and families who meet criteria for services.	Offices, Regions	NH DHHS
NH Community Colleges	The Community College System provides residents with affordable, accessible education and training.	Offices	Community College System of NH
Public Health Networks	The Public Health Networks' mission is to expand regional infrastructure and coordination around public health services and to partner with agencies to deliver public health services.	Regions	NH DHHS
Regional Early Childhood Coalitions	Regional Early Childhood Coalitions were formed to streamline supports for young children at a regional level. In June 2020, the NH Alliance of Regional Early Childhood Coalitions was formed with the goal of serving as an umbrella organization to member coalitions.	Regions	Correspondence with Program Staff
School Administrative Units	DOE's School Administrative Units oversee the operations of school districts. Every school district belongs to a unit, and each unit must provide superintendent services.	Regions	NH DOE

Note: DHHS = Department of Health and Human Services, DOE = Department of Education, NH = New Hampshire

To further support the workgroup, our team used several tools within ArcGIS to analyze cross-system dynamics. First, we used a technique known as “union analysis”¹² to identify areas of overlap and gaps across multiple system regions. For example, we used this technique to explore potential overlap across New Hampshire’s Department of Health and Human Services’ Division of Family Assistance (DFA) regions, Head Start regions, and New Hampshire’s Department of Education Administrative regions. As shown in Exhibit 7, the number of regions for each of these systems varied—the DFA system has 11 regions, whereas the Head Start and Department of Education Administrative systems each include five regions. When these three systems were layered on top of one another, the union analysis revealed 26 unique coverage areas on the map (see right-most map in Exhibit 7). This analysis underscored the challenge of how to create a new coordinated system, given differences in regional agency boundaries.

Exhibit 7. Example Union Analysis with Three New Hampshire Systems



Note: DHHS-DCYF DFA = Department of Health and Human Services-Division of Children, Youth and Families’ Division of Family Assistance, NH DOE = New Hampshire Department of Education

¹² For more information, see: <https://pro.arcgis.com/en/pro-app/latest/tool-reference/analysis/union.htm>

Regional Variation in Access

To further support the development of and planning for Early Childhood Regions, we explore how access to licensed child care varies by region as of Spring of 2021. As shown in the graph below (Exhibit 8), Greater Derry and Manchester Region (Region 4) had the highest access score. The median access score for this region was 0.47, suggesting that there was about one slot for every two children. Greater Monadnock, Greater Sullivan, and Upper County (Region 1) and Central New Hampshire/Lakes Region (Region 5) had the lowest access scores. Scores in these regions hovered around 0.22 to 0.23, indicating that there was about one licensed slot for every four or five children in these regions.

The map that follows (Exhibit 9) provides additional town-level access information for each region. This map illustrates that even within regions with high or low access, there is important variation at the town and city level that should be considered.

Exhibit 8. Median Access Scores by New Hampshire Early Childhood Region

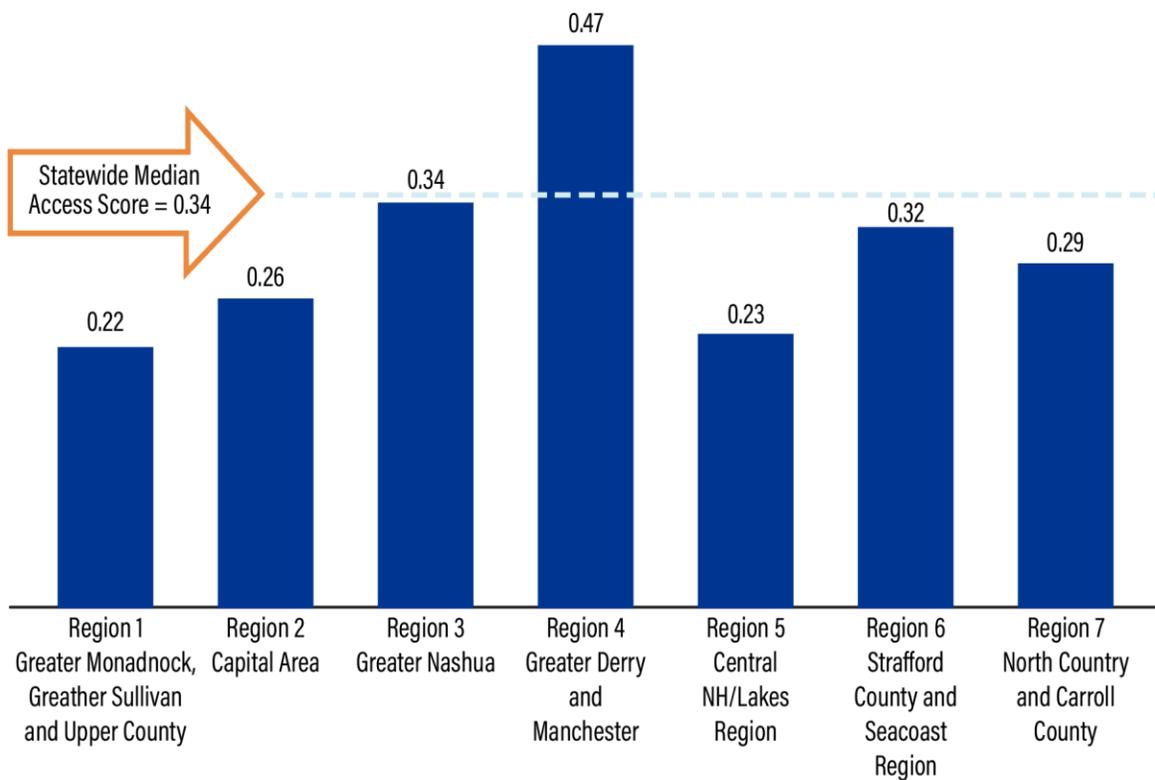
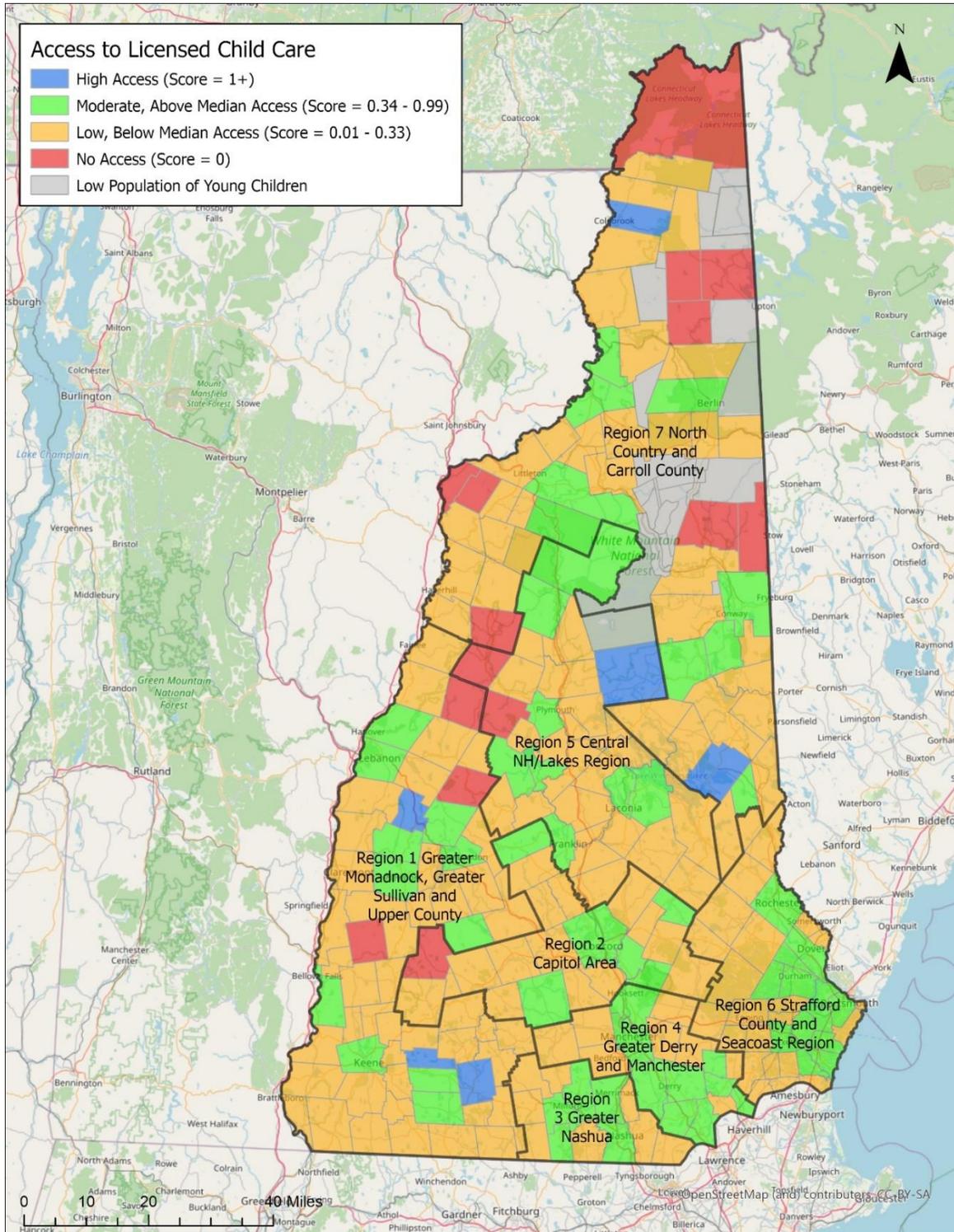


Exhibit 9. Access Scores by New Hampshire Early Childhood Region



Future Directions

Families' overall access to child care in the Spring of 2021 included about one licensed slot for every three children in New Hampshire. This estimate is consistent with, although lower than, other recent estimates.¹³ Our results suggest that access may actually be lower than expected once we account for the driving distance between the family home and child care program.

It is important to note a few key limitations of this research, which are inherent in the *Enhanced Two-Stage Floating Catchment Area Methodology*. First, child care decisions are often complex and can hinge on factors that are unaccounted for in our analysis—such as proximity to the workplace, quality of care, affordability and the availability of financial assistance, and culture/language match. Furthermore, the child care program data used only include licensed programs. Informal care options, such as family, friend, or neighbor care or public school programs, are not currently accounted for given the lack of access to capacity data for these options. Finally, it is important to acknowledge that this research only considers the accessibility of child care in proximity to families' homes. Some families may prefer child care options near their workplaces or other meaningful geographic locations in their lives. This scenario represents a potential future direction for this research to expand the state's understanding of families' child care preferences.

Moving forward, there are a number of opportunities to build on the analyses presented in this brief. For example, local data from Coös County suggest that families' access to infant and toddler care is particularly low, with just 9% of infants and 14% of toddlers able to access child care.¹⁴ This suggests that an important next step could be incorporating additional programmatic data to further explore access to licensed child care for families with infants and toddlers.

We could also incorporate additional programmatic data to further explore the different types of care that families may be able to access. For example, we could explore whether families with low incomes have access to subsidized programs such as Head Start or programs that offer tuition assistance or scholarships. With the introduction of New Hampshire's Early Childhood Regions, as well as potential influxes of federal funds to support early childhood programs through the pandemic, the landscape will continue to evolve rapidly. Future analyses may also be helpful in examining how access changes over time to see if the location of child care deserts shifts as the COVID-19 pandemic continues and subsides.

Finally, as New Hampshire moves forward with a new regional infrastructure, local organizations will have unique opportunities to continue to collaborate to support family access to child care and other services. Our hope is that the online interactive maps can be a helpful tool to support regional leaders in better understanding the characteristics of their regions and help with data-driven decisions about new investments, resources, and interventions at the state and local levels.

¹³ ESI Econsult Solutions Inc. & National Center for Children in Poverty. (2021). *Constraints on New Hampshire's Workforce Recovery: Impacts from COVID-19, Child Care and Benefit Program Design on Household Labor Market Decisions*. Author. Retrieved from: [PowerPoint Presentation \(nh.gov\)](#)

¹⁴ White, M. (2021). *State of Child Care in Coös County*. Coös County Director Network.

Appendix A: Approach for Creating Access Scores

This section briefly describes the data sources and analytic approach used to generate access scores.

Data Sources

Analyses for the child care deserts relied on two primary data sources. The first data source is a list of licensed programs in New Hampshire from the New Hampshire Department of Health and Human Services. This administrative dataset from the Spring of 2021 provides key information on licensed child care program location and capacity.¹⁵ Second, we used child population data from the Census and American Community Survey (ACS). To identify the location of young children under 5, we updated *block*-level population estimates from the 2010 Census with more recent *block group*-level¹⁶ data from the ACS 2014-2018 five-year estimates.¹⁷

Analytic Approach

To map child care deserts in New Hampshire, we relied on an advanced analytic technique known as *Enhanced Two-Stage Floating Catchment Area Method* (E2SFCA). This technique has garnered attention in the early childhood literature for its family-centered approach to understanding gaps in the supply of and demand for child care.¹⁸ This method may improve on other approaches to identifying gaps by: incorporating information about the distance families must drive to access care; ignoring arbitrary administrative boundaries (e.g., Census tract lines) when identifying potential child care programs for families; and accounting for the availability of child care slots relative to the population of nearby families with young children who might also want to enroll in those slots. To implement the E2SFCA method, our analyses involved two general stages with the goal of creating a continuous “access score” to quantify the availability of child care slots for young children in New Hampshire.

¹⁵ Program data are limited to licensed providers and do not include informal/unregulated care. We were concerned that the number of total slots might *overestimate* supply because the population information (from the Census) only includes children *up to 5 years*, whereas some programs serve school-age children. We addressed this concern by: (1) excluding programs that were licensed as summer camp, park and recreation, or exclusively school-age and (2) only incorporating slots for infants, toddlers, and preschoolers—and removing any slots assigned to “school-age” children. If capacity information was available for the total program, but was missing *by age*, we approximated the number of school-age slots by using average capacity information for programs with similar license type and age range served and excluding this number from our analysis.

¹⁶ For definitions of block-level and block group-level, see:
<https://www2.census.gov/geo/pdfs/reference/GARM/Ch11GARM.pdf>

¹⁷ We used block-level data on the population of children under 5 from the Decennial Census 2010 Table P.12 and the block group-level data from the 2014-2018 five-year ACS Table B01001 to estimate the population of children under 5 at the block level. We then used block group-level data on the number of families with children under 5 from the 2014-2018 five-year ACS Table B17010 to estimate the number of families with children under 5 at the block-level.

¹⁸ For example, see: Davis, E. E., Lee, W. F., & Sojourner, A. (2019). Family-centered measures of access to early care and education. *Early Childhood Research Quarterly*, 47, 472-486.

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: Center for American Progress.

During Stage 1, we estimated the potential demand for each eligible child care program. To do this, we calculated the travel time between each program and family location¹⁹ using Open Source Routing Machine (OSRM), a tool for calculating drive time between two geocoded points. All young children within a 20-minute drive time of the program were then considered eligible enrollees for that program. We then applied a distance decay function to “discount” children who live farther from a program and who presumably are less likely to enroll.²⁰ Lastly, we calculated the “capacity-to-population ratio” for each program to generate a one-dimensional score that represents the size of a supply-demand gap. To calculate this ratio, we divided the number of slots²¹ at each program by the total population of eligible children who might theoretically enroll (i.e., distance-discounted children within the 20-minute drive time). To interpret the final capacity-to-population ratios, it is helpful to consider a few scenarios. As one example, providers may differ in their scores if they have the same number of slots yet differ in how many families are competing for those slots. Similarly, providers may differ in their scores if they have comparable demand from nearby families but differ in how many slots they can offer.

During Stage 2, we focused on child care supply from the family perspective. We identified all programs within a 20-minute drive time from the family’s home using the OSRM tool described in Stage 1. We then applied the same distance decay function used in Stage 1 to “discount” the capacity-to-population ratios of providers located farther away from a child’s home to reflect family preferences for their children to attend nearby programs. Finally, we added up the discounted capacity-to-population ratios for the providers within a child’s catchment area. The sum of these discounted capacity-to-population ratios is the final “adjusted supply” or “access score” for child care reflecting the number of slots available to each child at a particular location accounting for both distance and demand by nearby families. A final access score of 0 indicates that no licensed programs are within a 20-minute driving distance of a family home. A final access score of 0.5 indicates that there is half a slot at a child care program available—in other words, only one slot for every two children at that address. A score of 1 or more indicates that there is sufficient or excess provider capacity to accommodate all children in the family’s geographic area.

Appendix B. Community-level Contextual Factors

A key goal of the Preschool Development Grant Birth through Five (PDG B-5) is to improve the lives of vulnerable young children and their families who are not already connected to, do not have access to,

¹⁹ Population data from the Census allows us to estimate the number of families with young children for an entire census block. To approximate precise family locations, we relied on parcel and computer-assisted mass appraisal data from the New Hampshire Department of Revenue Administration. These data contain information on residential addresses in the state. In 94% of Census blocks with children under 5, we randomly assigned residential addresses from a particular block to families within that same block as their precise geo-locations. In 1% of blocks, there were fewer residential addresses than families, so we assigned multiple families to each residential address. Finally, about 5% of blocks lacked data on residential addresses, so all families were assigned the location of the block centroid.

²⁰ We incorporated this assumption into our estimates by multiplying the driving time by a close variant of the traditional Gaussian distance decay function: $f(t) = e^{\frac{-t^3}{1000}}$ This work builds on prior desert maps by Davis, Lee, & Sojourner (2019), who applied an exponent of 4. We use the cube of time (an exponent of 3) to incorporate more information about families who live within the full 20-minute drive time.

²¹ The administrative data provided information about offered and licensed slots. We used *desired* slots, except when information was missing and then we relied on licensed slots. We chose to give preference to desired slots knowing that many providers may be reducing the number of children served due to the COVID-19 pandemic health and safety concerns.

and/or do not have information on the full range of supports and services available. To this end, we incorporated additional layers into the interactive map to better contextualize the New Hampshire communities where child care deserts may exist. The data are summarized in Exhibit B.1 below.

Exhibit B.1. Community Contextual Factors for the New Hampshire Mapping Analysis

Contextual Factor	Definition	Categories	Source
Child Population	Number of children under 5 years old (2015-2019)	<ul style="list-style-type: none"> ■ = High (181 to 690 children under 5) ■ = Medium (180 to 341 children under 5) ■ = Low (Fewer than 179 children under 5) 	ACS 5-Year Report
Health Care Access	Percent of population under 19 with no health insurance coverage	<ul style="list-style-type: none"> ■ = High (8% to 29%) ■ = Medium (2.8% to 7.9%) ■ = Low (Less than 2.7%) 	ACS 5-Year Report
Immigration Status	Percent of children under 18 who are foreign born or live with at least one foreign-born parent	<ul style="list-style-type: none"> ■ = High (26.2% to 59.6%) ■ = Medium (10.8% to 26.1%) ■ = Low (Less than 10.7%) 	ACS 5-Year Report
Limited-English Household	Percent of children 5 to 17 years in limited-English households	<ul style="list-style-type: none"> ■ = High (6% to 38%) ■ = Medium (0.7% to 5%) ■ = Low (Less than 0.6%) 	ACS 5-Year Report
Poverty Status	Rate of children under 6 years who live below the federal poverty line	<ul style="list-style-type: none"> ■ = High (3.8% to 7.8%) ■ = Medium (1.1% to 3.7%) ■ = Low (Less than 1%) 	ACS 5-Year Report
Race & Ethnicity	Percent of the total population for: <ul style="list-style-type: none"> • Black or African American • Hispanic or Latino • Non-Hispanic White • American Indian and Alaska Native • Native Hawaiian and Other Pacific Islander • Some Other Race • Two or More Races 	<p>Black or African American</p> <ul style="list-style-type: none"> ■ = High (6.1% to 13.4%) ■ = Medium (2.1% to 6%) ■ = Low (Less than 2%) <p>Hispanic or Latino</p> <ul style="list-style-type: none"> ■ = High (14.7% to 38%) ■ = Medium (4.3% to 14.6%) ■ = Low (Less than 4.2%) <p>Non-Hispanic White</p> <ul style="list-style-type: none"> ■ = High (87.9% to 99.6%) ■ = Medium (70.6% to 87.8%) ■ = Low (Less than 70.5%) <p><i>For a complete list of definitions, please see the interactive maps.</i></p>	ACS 5-Year Report

Note: ACS = American Community Survey; All ACS data in the interactive map are automatically updated annually in October. The maps currently show ACS 5-year estimates for 2015-2019. Unemployment data are automatically updated monthly.