EXECUTIVE SUMMARY

Subsidized Child Care in Massachusetts: Exploring geography, access, and equity

A joint report of:
The Institute for Child, Youth and Family Policy at Brandeis University
The Massachusetts Child Care Research Partnership
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Report Overview

How can exploring issues of geography, access, and equity in subsidized child care in Massachusetts help to address pressing child care and early education policy questions?

Researchers have been exploring this question over the past five years through the work of the Massachusetts Child Care Research Partnership and the diversitydatakids.org project. A synthesis of research topics explored, methods, data sources and technologies utilized, and policy-relevant findings from five analyses conducted are summarized in the report, *Subsidized Child Care in Massachusetts: Exploring geography, access, and equity*, a joint report of the Massachusetts Child Care Research Partnership and diversitydatakids.org.

This report provides a synthesis of five years of geographic and spatial research related to issues of access to federally subsidized child care for low-income working families in Massachusetts. The purpose of this research synthesis is to:

- Synthesize findings related to geographic access to and supply of subsidized child care in Massachusetts in order to inform child care policymaking in Massachusetts, other states, and at the federal level
- Synthesize geographic analysis methods, data sources, measurement approaches and technologies used to conduct this research in order to offer a starter resource/toolkit for other researchers, analysts and policymakers, both in Massachusetts, and in other states

In addition to informing child care policy issues in Massachusetts, the report is designed to serve as a resource for other analysts, researchers and policymakers working to develop methods and tools to analyze, monitor and address issues of child care and early education access and supply. It may be particularly useful for those working to understand and address issues of equal access and racial/ethnic equity, given the heightened child care affordability challenges affecting U.S. black, Hispanic, and low-income working family populations, relative to other groups (Baldiga et al., 2018).

Research topics covered in the report include:

- Geography of need for subsidized child care in Massachusetts
- Geography of met need for subsidized child care in Massachusetts
- Geography of the "dual-mechanism" (voucher/contract) subsidized care system
- Geography of "subsidized child care deserts" and patterns by child race/ethnicity
- Geographic patterns in travel to subsidized child care

By summarizing the research questions, methods and approaches across five different analyses, the report shows examples of how to ask spatial questions using different data sources, and how to consider issues of place and space in analyzing child care and early education policy research questions. Some of the research questions highlight how spatial methods and GIS can be used to conduct inductive and exploratory analyses, where examination of geographic patterns

and properties can help to generate hypotheses and identify new policy-relevant issues that warrant investigation. Other research questions described in this report show examples of how GIS/spatial methods can be used to inform specific research questions, defined a priori.

The report demonstrates the use of a wide range of GIS/spatial analysis methods and corresponding softwares and online tools including the following:

Methods:

- Descriptive mapping
- Georeferencing/geocoding
- Nearest Neighbor Analysis
- Zonal statistics/spatial summary statistics
- Exploratory Spatial Data Analysis (ESDA): Cluster analysis, Local Anselin Moran's I (LISA statistics)
- Distance calculations (street network travel distance and travel duration)

Tools:

- ESRI ArcGIS Desktop Mapping and Analysis Software
- Open Source Routing Machine (OSRM) open-source code for use with STATA (Huber and Rust, 2016)
- Georoute open source code for use with STATA (Weber and Peclat, 2016)

Data for all analyses are made possibly from the integration of two key sources--state administrative records related to the child care subsidy system, and contextual community-level data from the U.S. Census and American Community Survey. The analytic administrative dataset was created in connection with the Massachusetts Child Care Research Partnership between EEC and Brandeis and Boston Universities. The Massachusetts Child Care Research Partnership was sponsored by the federal Office for Planning, Research & Evaluation (OPRE), Administration for Children & Families (ACF), U.S. Department of Health & Human Services (HHS), under its Child Care Partnership Research Grant Program, 2013 cohort.

The analytic administrative dataset draws from the administrative systems used by the state of Massachusetts for the purposes of operating the child care assistance program. The dataset includes child-level records for all children participating in the subsidy system between January 2012 and June 2015. Within each child-level record, the dataset includes detailed monthly information on subsidy usage, eligibility type, child care provider, a set of personal characteristics, and family information (including child's home address). Knowing each child's child care provider in each month, we can link to the provider-level administrative records to integrate information about providers with the information from child-level records.

Using Geographic Information System (GIS) mapping and spatial methods, we then linked the analytic administrative dataset to contextual datasets that provide additional information about children's and providers' communities. The majority of ACS variables were accessed through the National Equity Research Database (NERD), a product of diversitydatakids.org that makes available state, sub-state regional, and community-level

(e.g., county, city/town, neighborhood) contextual indicators based on ACS published variables.

Summary of Research Findings:

Early childhood care and education is a locally-based, locally-accessed resource. A vast majority of families in the U.S. access care close to home, at locations that enable working parents to feasibly and consistently get to work. The local area around which a family lives forms the family's primary choice set for care, and therefore has the potential to shape parent behaviors and decision-making, as a majority of families will search for and seek care within their local choice sets.

Given the localized nature of early childhood care and education (ECE), it is logical for policymakers to think systemically about how the geography of ECE opportunities and the geography of families relate to one another as they engage in policy and program planning, assessment, design and implementation. However, an intentional focus on issues of local access and the role of geography in ECE policy has been lacking until recently. The main findings of the report confirm the importance of looking "under the hood," i.e., looking at ECE systems at multiple levels of geography, from the neighborhood to the state level, for understanding the functioning of ECE systems. None of the analyses in this report suggest that local areas are simply microcosms or mirror images of the larger regional or state areas to which they belong. The consistent finding of local heterogeneity suggests that both family-side and system-side factors vary in how they interact at the local level, making an understanding of geographic variations crucial for considering how policy can help produce efficient and equitable ECE systems.

Key lessons from this report include:

> Understanding the "geography of need" is important for understanding the context/backdrop in which state policies are made. It can be thought of as the "base map" for ECE state policy-making.

A primary goal of state level ECE policy is to ensure that ECE systems are reaching the children who need care and education, particularly vulnerable children. Understanding where children in need live and how they are distributed across the state is a crucial contextual factor to inform policymaking to achieve this goal. Massachusetts' geography of need for subsidized child care is characterized by "bifurcation" – i.e. it includes areas of extremely high concentrations of need, particularly around urban hubs, paired with areas of low concentration (i.e. dispersion) of children in need across many disparate cities/towns. See Map 1a.

There are many implications of this bifurcated geography for considering service delivery systems. For example, policymakers in this context should consider whether approaches that are effective, efficient and equitable in high concentration of need areas produce similar outcomes in more dispersed areas of need.

Understanding the "geography of met need" provides a window into how family-side and ECE system-side factors interact differently in localities across a state.

In Massachusetts (similar to many other states), only a portion (an estimated 21% of estimated eligible children under 6) of children and families in need of child care assistance are served by the subsidy system. At any point in time, there can be nearly 25,000 children on the waitlist for child care assistance in Massachusetts, which is a result of limited funding for child care assistance to support families in need. It is important for policymakers to know if service rates across cities and towns are similar or different from one another. Differences in service rates could be driven by a number of factors, such as differences in city/town level supply of subsidized care, e.g. different levels of capacity/sufficiency in the supply of subsidized care, or differing levels of choice of quality subsidized providers, amongst other system related factors (e.g. different barriers/facilitators of access for obtaining and maintaining child care assistance, such as local availability of subsidies and local administrative practices and capacity). Differences in service rates could also be a function of local variation in family-side factors (e.g. differing levels of demand/need for subsidies, different parent preferences, different local norms and take-up behaviors).

The analysis in this report shows that the level of met need varies meaningfully across different cities/towns in Massachusetts, ranging from 0% (no eligible children served) to 100% (all eligible children served). See Map 2a. Two different children, both equally eligible for subsidized care, but who live in different cities/towns, have very different likelihoods of participating and accessing the subsidy system. These differences mean that the cities and towns within the state do not necessarily take on the "average" levels of met need observed statewide (i.e. levels of met need are not uniform across cities/towns), which tells us that system-side and family-side factors are interacting differently at the local level, and producing very different levels of local met need. These local differences raise questions about why service rates are so much higher in some areas, compared with others. Are there differing levels of demand? Are families in different localities facing barriers to accessing the subsidy system and/or barriers to obtaining subsidized child care? Are there underlying imbalances in local allocations of child care assistance? Are local ECE systems functioning differentially and driving these differences in local levels of met need?

Examining the "geography of the dual-mechanism (contract/voucher) system" in Massachusetts offers insights for policymakers considering the role of geography for either (i) shaping existing contracting systems, or (ii) introducing/implementing new contracting systems.

The Massachusetts subsidy system can be characterized as a "dual-mechanism" subsidy system in that there are two different mechanisms through which the state disburses subsidies--(1) child care vouchers and (2) contracted child care slots.

For income-eligible families, the assignment of vouchers or contracted slots is based on available options at the time a child is called off the subsidy wait list.[1] In other words, a parent does not chose whether they receive a voucher or a contracted slot. Income-eligible families could turn down a slot or voucher based on preferences up to three times, however the long waitlist creates an incentive to accept the assigned voucher or slot. Income-eligible families who accept a contracted slot must use the contracted provider they are assigned--i.e., a parent is offered a slot with a specific provider and can accept or reject the slot with that provider, but a parent does not have the option of choosing between multiple slots (at different providers). Income-eligible families who are assigned a voucher could use the voucher with any provider that accepts vouchers or a contracted provider that has contracted slots but also accepts vouchers.

Statewide, about half of income-eligible children under age 6 in Massachusetts receive vouchers (52%) and about half (48%) receive contracted slots (data as of December 2014). Families receiving vouchers have greater flexibility to choose their provider, but may also face the uncertainty of finding a provider that will accept the voucher, as provider participation in the subsidy system is voluntary. Families receiving contracted slots have less choice when it comes to selecting a provider, but have the certainty of a subsidized child care slot. In fact, greater certainty of supply for families is one of the policy goals of the contracting system in Massachusetts (particularly for certain groups of families, including those in need of infant/toddler care and those living in underserved urban and rural areas). Both subsidy mechanisms--vouchers and contracted slots--bring a mix of benefits and challenges for families, and so understanding the geography of the dual-mechanism system helps us to understand important characteristics of families' local subsidized child care choice sets.

Because only a small number of states nationally have a dual-mechanism subsidy system, these systems are understudied and little is known about the capacity and usage characteristics of dual-mechanism systems at a local (sub-state) level. The need to understand more about dual-mechanism systems has recently increased, however, as these systems are expected to become more common in the wake of the 2014 CCDBG reauthorization, which highlighted the use of dual-mechanism systems as a tool for bolstering supply and achieving more equal access (Child Care and Development Block Grant Act of 2014). The findings are also highly relevant to Massachusetts policymakers given the large role of contracts in the Massachusetts subsidy system, providing insights about the system as the state evaluates the criteria and process used to award and allocate contracts, and the role of geography in that process.

In Massachusetts, contracts are intentionally allocated across six Early Education and Care (EEC) regions determined by the lead CCDF agency in Massachusetts, The Massachusetts Department of Early Education and Care (EEC). Beyond this regional allocation across

[1]Note: TANF-eligible families are exclusively served through vouchers.

the six EEC regions, there are no geographic criteria for allocating contracts within EEC regions. We find that, within regions, contracted providers tend to geographically concentrate and cluster around urban hubs. This clustering results in many city/town-level ECE markets being dominated by contracted providers (i.e. contracted providers hold more than half of local subsidized care capacity). Meanwhile, many other cities/towns are characterized by an absence of contracted providers. The majority of local subsidy capacity in those areas is held by voucher-only providers. See Map 3b. This geographic imbalance between contracted and voucher providers is not inevitable, though; statewide subsidized capacity is split roughly equally between contract and voucher-only providers. However, in practice, we observe very few "balanced" markets, where contracted and voucher-only providers have roughly similar presence in the local market.

More work is needed to understand whether these imbalances are causing inefficiencies and/or inequities in the subsidy system, or could even benefit the functioning of the subsidy system. However, a key takeaway is that without intentional strategies for shaping the geographic reach of contracts, the geography of a contract system will emerge "on its own", i.e., from the confluence of many factors (some geographic in nature, others not), and this geography could take any number of shapes, with varying implications for the efficiency and equitability of the subsidy system.

Travel analysis tells us that essentially all parents (90%) are likely accessing some form of transportation, *other than walking*, to get to child care providers, and that local travel times vary substantially, making transportation access a relevant consideration for ECE policymakers.

While there is relatively little research that specifically examines how low-income working parents' transportation access influences their ability to access child care, related research has identified transportation as an important barrier to participation in early childhood programs, particularly for certain groups, often vulnerable groups such as immigrant families (Greenberg et al., 2016; Neidell and Wadfogel, 2009). Other research has identified a relationship between transportation access, particularly car access, and employment outcomes for low-income workers (Smart and Klein, 2015; Blumenberg and Pierce, 2016). These findings suggest the need for more research related to the transportation strategies, behaviors and needs of low-income working parents, including how low-income parents get their children to and from child care each day. Despite policymakers' concerns about the transportation barriers facing low-income families, most states have little systematic information about the distances that low-income parents travel to child care providers, and how distances and travel times may vary across localities that are extremely diverse in terms of their geographic size and density, the quality of their public transportation networks, traffic density, walkability of streets, etc.

In Massachusetts, our analysis finds that 90% of children live outside reasonable walking distance (half-mile) from care, which suggests that essentially all families are utilizing some mode of transportation, other than walking, to get to care. We also find that travel times vary across the state, with average travel times of about 9 minutes (one way), suggesting modest average travel burden for accessing care. See Map 5a.

However, while many families face moderate travel burdens, many others face substantially higher travel burdens, upwards of 20 to 40 minutes (one way). This could signal that transportation access is more likely to be a barrier to access in some localities than others, making a one-size-fits all approach to meeting families' travel needs likely inefficient and possibly inequitable. More work is needed to understand how travel barriers may be influencing families' ability to access and maintain child care, but the preliminary findings point to the importance of examining transportation issues at the local level.

By examining "Subsidized Child Care Deserts," we identify areas where children are very isolated from access to child care providers. In the context of high levels of child racial/ethnic residential segregation, this isolation could translate into "Extreme Child Care Deserts."

Over the past two decades, researchers and policymakers have focused considerable attention on food deserts--local areas, especially low-income communities, with limited access to affordable and nutritious food outlets (U.S. Department of Agriculture, Economic Research Service, 2009). In recent years, large national early childhood advocacy organizations (Child Care Aware), and think tanks alike (Center for American Progress) have brought increasing attention to the concept of "child care deserts"-- local areas with very limited supply of child care providers. This increasing focus on "child care deserts" is part of a larger research and policy agenda focused on issues of equity in local access to child care.

Despite the growing attention to issues of local child care access, there is little systematic research on local variation in the availability of child care and the pervasiveness of child care shortage areas. There is even less information about the availability of and shortages in *subsidized* child care at the local level motivating our examination of the prevalence of subsidized child care shortage areas--"subsidized child care deserts"--in Massachusetts. We also explored issues of racial and ethnic equity in local access by examining whether subsidy eligible and subsidy participating children of different racial/ethnic backgrounds are more (or less) likely to live in shortage areas relative to other groups. Knowing that children of different racial and ethnic groups tend to live in different neighborhoods due to high levels of residential segregation amongst children (Acevedo-Garcia et al., 2014) motivates us to investigate whether the conditions in those different neighborhoods--in terms of availability of subsidized child care--are equitable across the state. In the context of residential segregation, local inequities in the availability of

subsidized child care can translate into systematic racial/ethnic inequities in the local availability of care, which could have numerous downstream implications for racial/ethnic equity. A lack of locally available subsidized care could serve as a barrier to obtaining child care to support working parents and quality early educational experiences for children. Therefore, systematic differences in local availability that occur along racial/ethnic lines, have the potential to reinforce and perpetuate population level racial/ethnic inequities in the very parental economic stability and healthy child development outcomes that the CCDF program is designed to promote.

We learned from our analysis that when using definitions of "Child Care Deserts" established by others in the field (Malik and Hamm, Center for American Progress, 2017), we observe a subsidized child care system rife with shortage areas that span the entire state, and conclude that half of subsidy income-eligible children live in a "desert". See Map 5a.

Deeper examination of the application of these definitions showed us that while they are useful for characterizing systematic shortages in the system overall, these definitions may obscure meaningful qualitative differences in the degree of shortage and isolation from care that children in different neighborhoods are facing. Using the established Malik & Ham measures, a neighborhood with 40 eligible children in excess of subsidized seats, with no surrounding "desert" neighborhoods could achieve the same child care desert score as a neighborhood with 481 children in excess of subsidized seats that is completely surrounded/bordered by other neighborhoods with 200+ children in excess of subsidized seats. While both neighborhoods have shortages, there are policy-relevant qualitative differences in children's levels of access in these two neighborhoods.

To advance our understanding of shortage areas and issues of racial/ethnic equity, we developed a definition for "Extreme Child Care Deserts" designed to identify neighborhoods that are qualitatively distinct in terms of having extremely high levels of unmet need paired with extremely constrained supply of care, and that are also surrounded by neighborhoods with similar conditions. Using this definition, we find that nearly 1 in 5 subsidy eligible children live in these extreme deserts, and also observe large racial/ethnic differences, with nearly one-quarter of black and Hispanic eligible children living in these "extreme deserts" compared with only 6% of white eligible children. See Map 5b.

This analysis points to the importance of ensuring that definitions and measures are aligned with the intended purposes. In this case, existing established measures were more informative for understanding overall, systematic shortages across the system, while the newly-developed measures were more informative for identifying the most potentially vulnerable neighborhoods/areas, and for examining the implications of racial residential segregation for equity in local access to care.

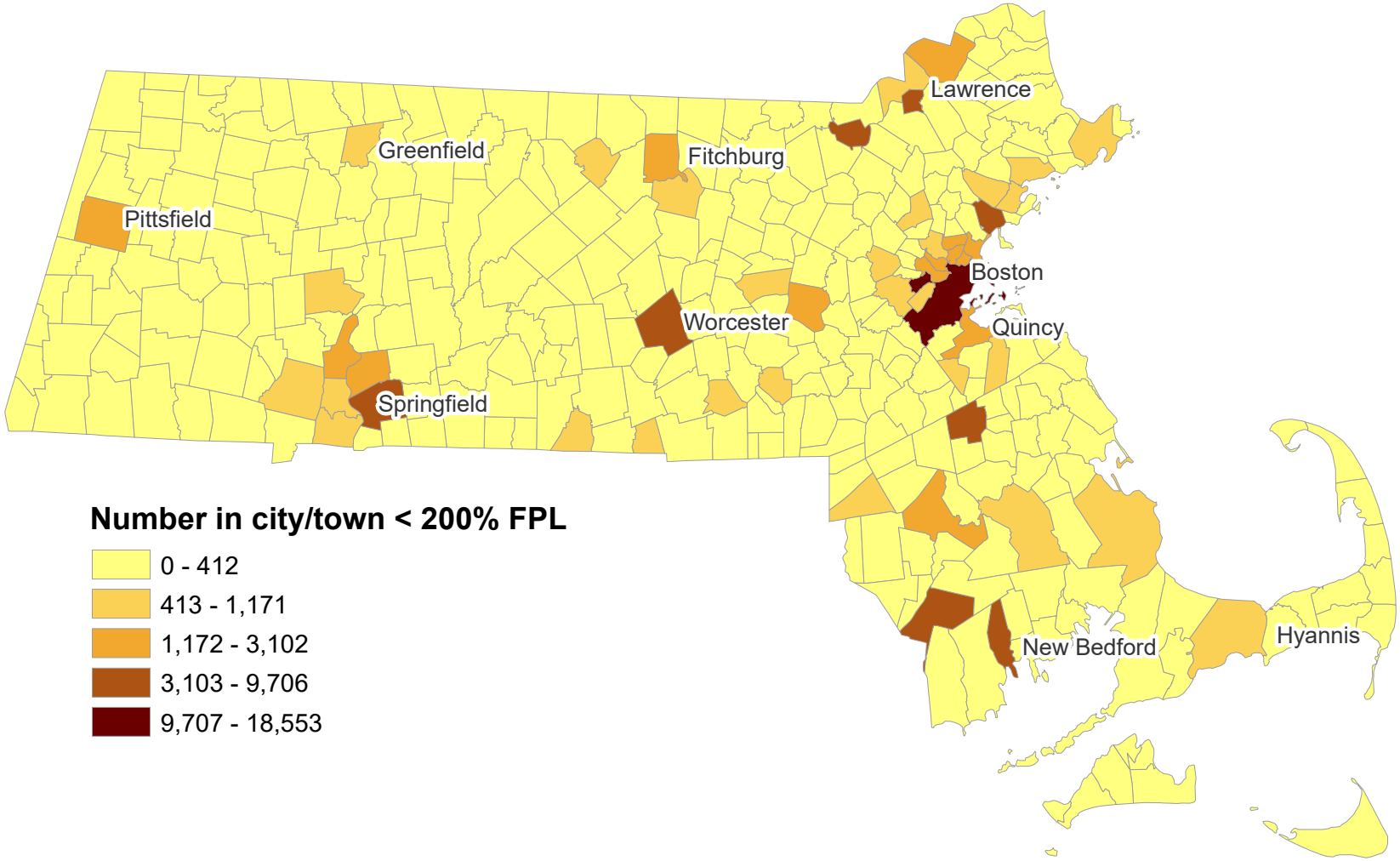
A Foundation for Next Steps

By not only summarizing findings, but by also describing the rationale and motivation for exploring spatial questions, the analytic approach, the methods, and the data sources for each analysis, the goal is that this report will serve as a resource to policymakers, planners and researchers alike, seeking to utilize GIS and spatial methods in their work to advance the goals of more effective, efficient and equitable early childhood care and education systems across the U.S. The authors welcome questions and continued dialogue about how GIS and spatial methods can increasingly be used to inform and advance early care and educational policy in the U.S. over time.

The full report is available at:
http://diversitydatakids.org/sites/default/files/file/geoofsubsidizedcare-fullreport.pdf

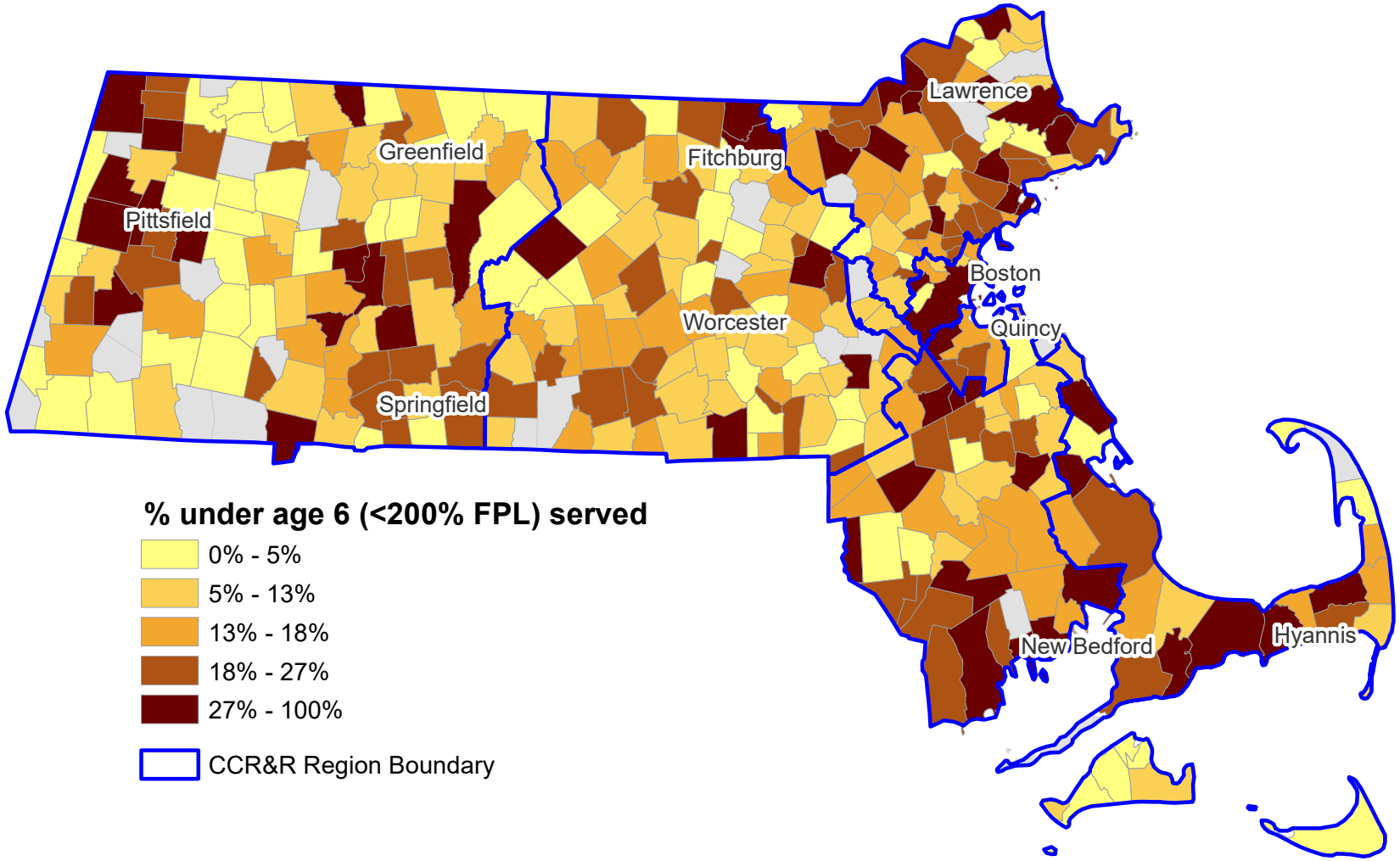
MAP 1A. THE GEOGRAPHY OF NEED FOR SUBSIDIZED CHILD CARE IN MASSACHUSETTS

Number of children under age 6 with family income < 200% Federal Poverty Level (FPL), by municipality (city/town)

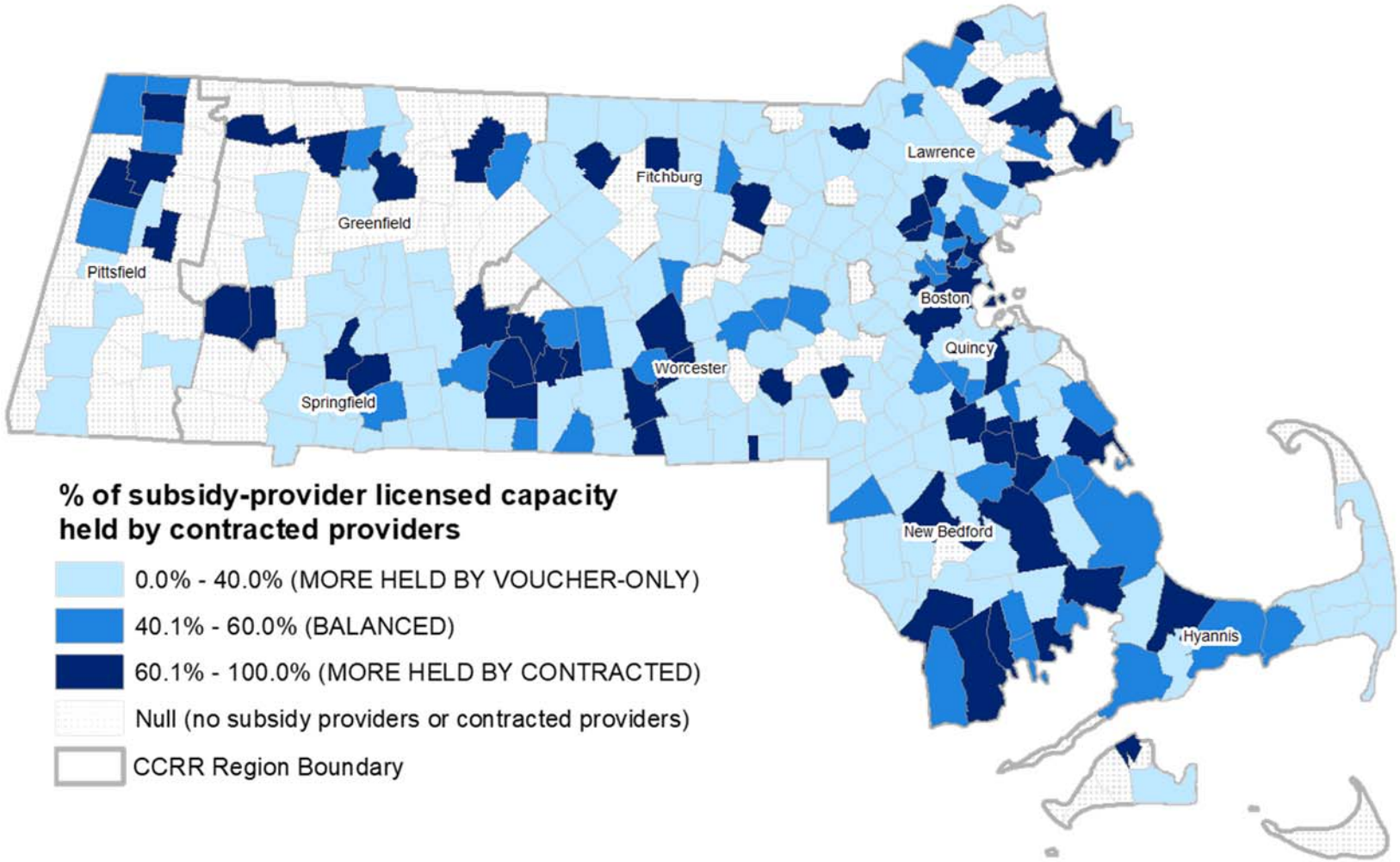


MAP 2A. THE GEOGRAPHY OF MET NEED FOR SUBSIDIZED CHILD CARE IN MASSACHUSETTS

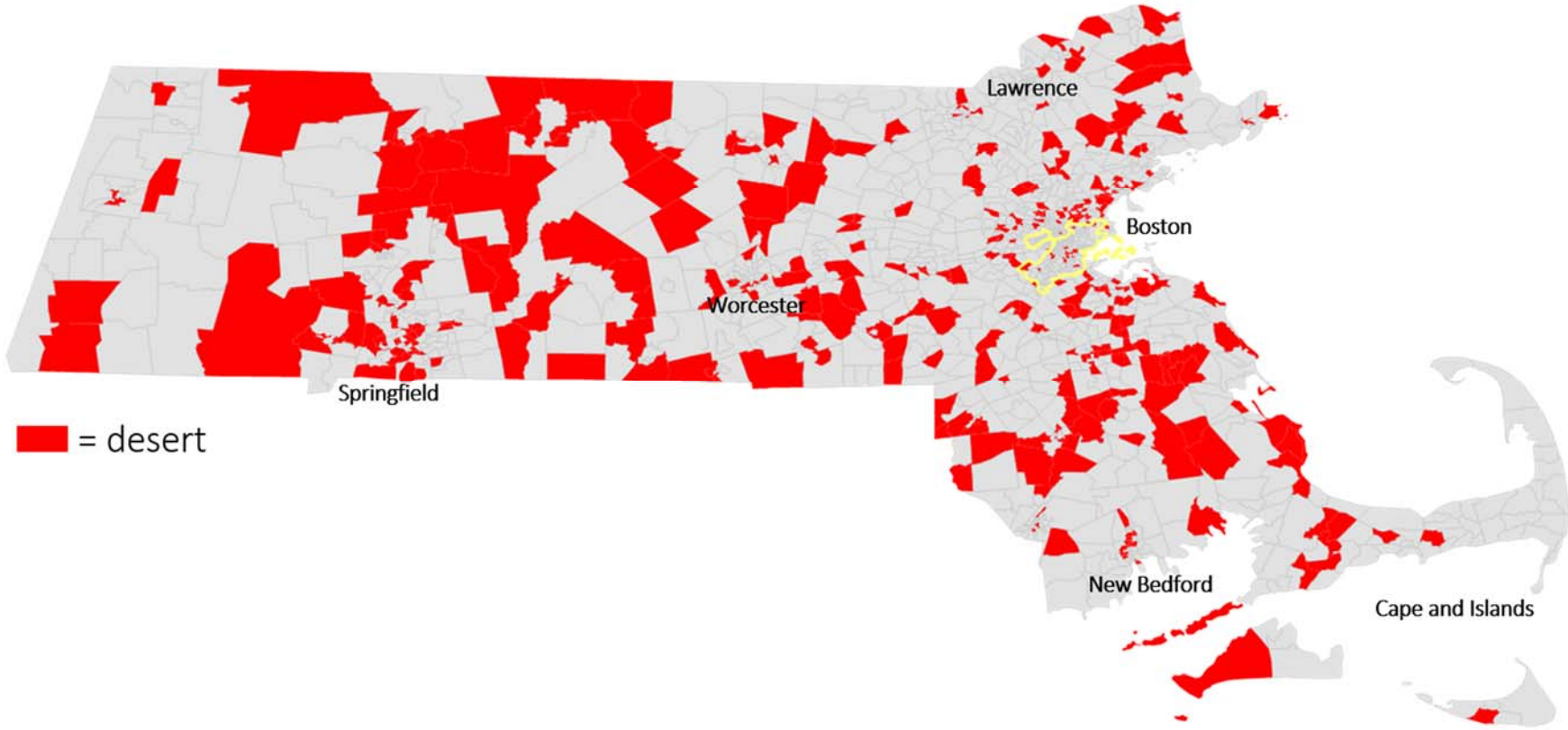
Percent of children under age 6 with family income < 200% FPL receiving child care assistance, by municipality (city/town)



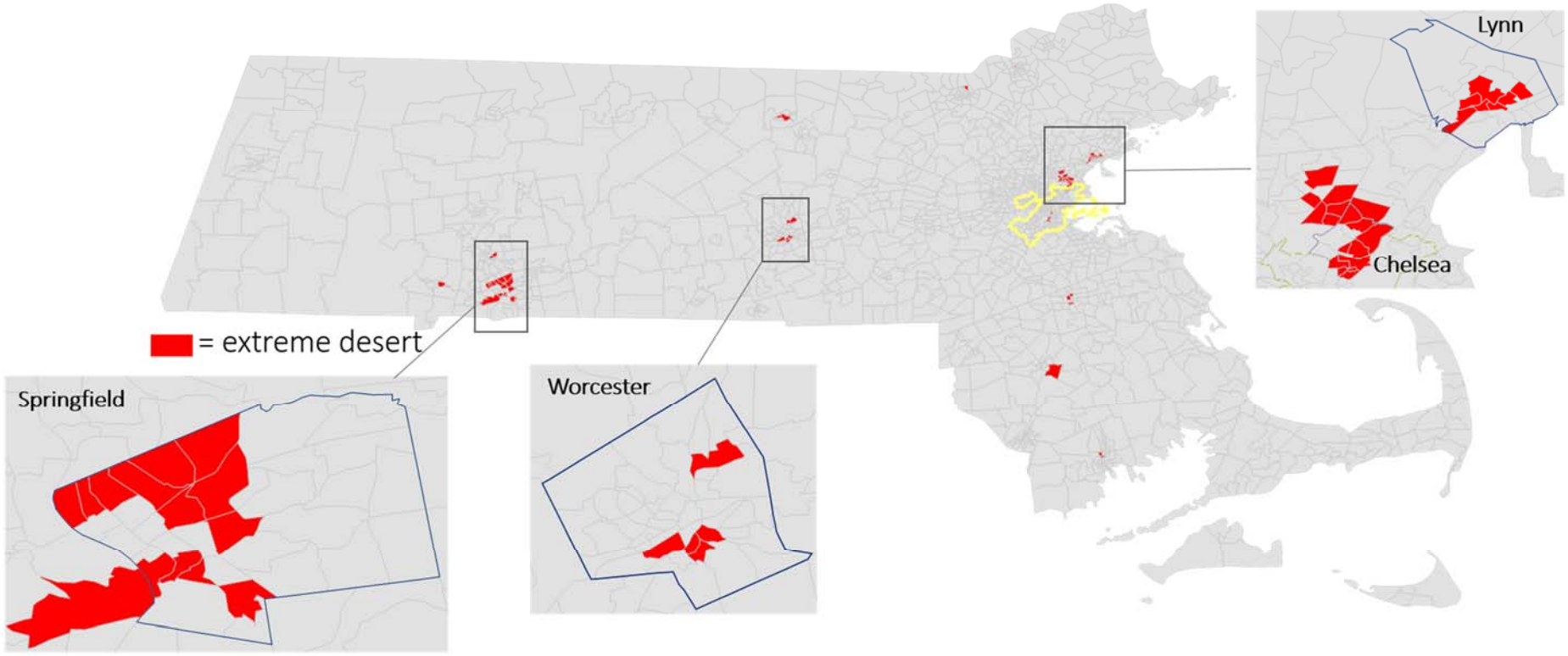
Map 3b. Share of subsidy provider capacity held by contracted providers



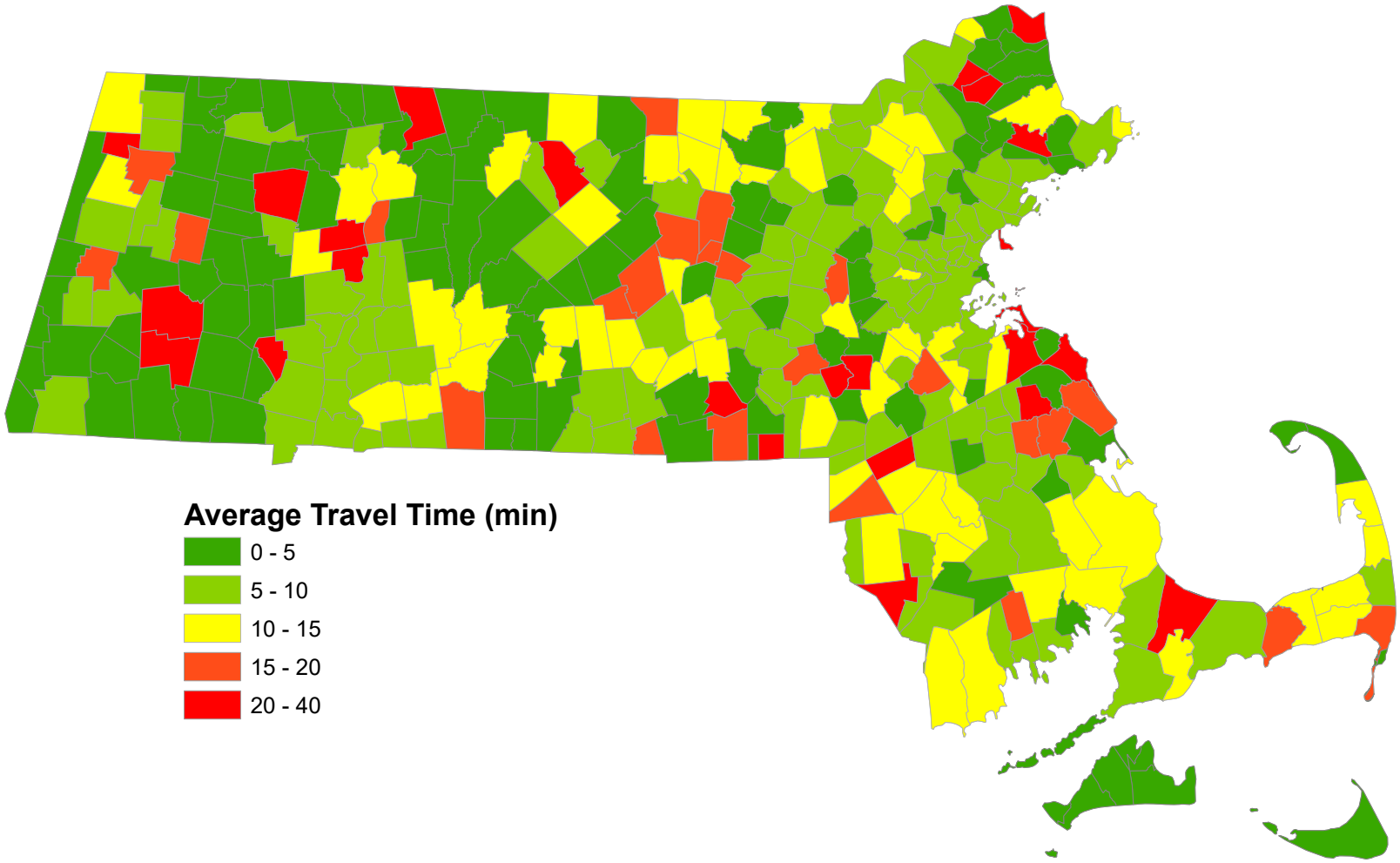
Map 4a. Geography of Subsidized Child Care Deserts in Massachusetts (Measure 1)



Map 4b. Geography of "Extreme" Subsidized Child Care Deserts in Massachusetts (Measure 2)



Map 5a. Average (one-way) travel time to provider by city/town (in minutes)



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