Are Family Centers Located to Maximize Participation in the Population of Interest?

Introduction

Child maltreatment is one of the most challenging public health issues facing families in Massachusetts. Family Center is one of the Children’s Trust Programs for preventing child abuse in Massachusetts. Serving as community hubs to provide parents with community-based supports, eight Family Centers have been working across the state by 2016 (see Figure 1 and Table 1). Substantial pieces of evidence are found that socio-economic factors are highly correlated with high rates of child maltreatment and that people at this kind of risk are also often spatially organized in communities.1-4 In particular, the impoverishment has the greatest effect on maltreatment rates, and a lack of supportive resources in the community have a direct relation to the risk.1,2 This analysis tends to identify the areas in poverty but low spatial accessibility to current Family Centers so as to assess to what extent Family Centers are located to maximize their target population of interest.

Methodology

Where are spatial clusters of the poor families with children under 18 years?2

A. Exclude locational outliers. Among census tracts (ALAND>0) in Massachusetts (n=1471), 72 tracts with a tract area that is >1.5 Standard Deviation above mean tract size and 17 coastal tracts or island tracts that have only one neighbor are excluded temporarily. 1382 census tracts remain for the analyses of B and C.

B. Define the most appropriate scale of analysis. Using the Calculate Distance Band from Neighbor Count tool (for two neighbors), the beginning distance (10000m) and incremental distance (1000m) are defined for the following Incremental Spatial Autocorrelation (ISA) analysis.

C. Identify where clustering is most pronounced. The first Z-score peak distance (1200m) reflects that 1382 census tracts have two neighbors and reach the most pronounced clustering at this distance using the ISA tool (See Graph).

D. Identify hotspots of poverty. A spatial weight matrix on all 1471 tracts is generated using 1200m as threshold distance and 2 as Number of Neighbors. Based on this result, the Hot Spot Analysis is conducted to identify the statistically significant spatial clusters of the high ratios of the income below poverty level (see Map 1).

Where are service areas of current Family Centers?

By the New Service Area tool, service areas are created on a cost attribute based on time and the direction Away From Facility. For catchment areas of each Family Center, service areas are generated on a network within 10-, 20-, and 30-minute driving time. For the sample catchment areas, Cambridge and Medford, service areas within 10-, 20-, and 30-minute walking time are also generated.

To what extent, are Family Centers located to reach target families in poverty?

The hotspot layer, service area layers, and the Family Center catchment area layer, are overlaid so as to identify the poverty clusters that are out of Family Center catchment areas or that have low accessibility to current Family Centers.

Results

Four Family Centers may consider expanding catchment areas. Catchment areas of the Family Centers in Springfield, Medford, Cambridge, and North Eastham, are covering the clusters of poor families with children under 18 years. They are also surrounded by poverty clusters, and most of these are 30-minute driving time away from the nearest Family Center.

Four areas may become candidate locations of future Family Centers. Worcester, Haverhill, Fall River, and New Bedford, are located in poverty clusters but are out of service areas within 30-minute driving time of current Family Centers.

Walkability needs to be considered in the selection of future Family center locations. In Medford, service areas within 30-minute walking time are almost not covering poverty clusters, such as Wellington.

Limitations

The analysis is a just start to assess the relationship between Family Center locations and poverty clusters of the families with children under 18 years in Massachusetts. There are other community-based factors with an impact on the child maltreatment rate, although the poverty status contributes most. Therefore, future research could be strengthened by integrating other relevant factors.

Furthermore, little is known about participants’ preference of traveling to the nearest Family Center in reality. The assessment of service areas could be refined if primary data available. Besides, the service providers to which Family Centers make referrals are not included in this analysis, so an expanded service network may exist in reality.

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