Family-Centered Measures of Access to Early Care and Education

Elizabeth Davis, Won Lee & Aaron Sojourner
University of Minnesota

in partnership with

Jonathan May
Think Small

Presented September 17, 2018 at the CIC Impact Summit
Minneapolis, MN
Think Small

• Mission:
  – To advance quality care and education of children in their crucial early years

• Goal:
  – Every child in Minnesota is ready for kindergarten

• How:
  – Preparing Early Childhood Professionals
  – Strengthen Families
  – Catalyze Change
Why?

• Measure the anecdotal
• Increase accuracy/add nuance
• Help providers and families
• Influence policymakers
Family-Centered Measures of Access to Early Care and Education

Elizabeth Davis, Won Lee & Aaron Sojourner

Presented at the CIC Impact Summit
Minneapolis, MN
September 17, 2018

Partial funding for this work has been provided by the Human Capital Research Collaborative, the University of Minnesota Grant-in-Aid Program, the Center for Urban and Regional Affairs Faculty Grant Program, and Minnesota Agricultural Experiment Station Project MIN-14-081.
In the news: “A quiet crisis: Minnesota’s child care shortage”

• “There's a shortage of child care, the cost is high and yet care-givers often don't make enough to keep them in the industry.” Nora Hertel, St Cloud Times, April 13, 2018.

• 26 percent of people in Minnesota live in a child care desert.
• [https://childcaredeserts.org/?state=MN&urbanicity=All](https://childcaredeserts.org/?state=MN&urbanicity=All)

Goal: Improve indicators of access to early care and education (ECE)

• Most conventional measures of child care shortages or child care deserts are area-based and measure the amount of supply relative to the number of children who may need care within a certain boundary (e.g., county or ZIP code).
How to measure “access” to high quality early care and education

• We developed new measures of access that are
  • Family-centered and distance-based (based on locations of families and providers)
  • Incorporate costs to parents based on both driving time and prices charged
  • Can be measured for different types of providers based on their star rating in the Minnesota Parent Aware Quality Rating and Improvement system

• Most measures of access are based on areas such as census tracks, ZIP code areas or counties → “Slots per tot”
Use family-provider pair travel times to measure proximity

Source: 2015 NACCREAdata & 2010-2014 ACS
Three measures (or indicators) of access

1. Adjusted supply
2. Total access costs
3. Quality premium
EXAMPLE:
Two providers (Yellow circles) Capacity 10 and 110 slots.

Eight children (Green circles)

Four administrative areas (A, B, C, D)
Conventional area-based measure of supply: Capacity (slots) divided by number of children
Two Stage Floating Catchment Area Measure of Supply

Stage 1: For each provider, sum the number of children within a certain radius of driving time.

Divide the provider’s capacity (slots) by the number of nearby children.
Stage 2: For each child, sum of the slots-per-nearby child ratios for all providers within a certain driving time radius to get the “adjusted supply” for each family.
Adjusted measure of supply (averaged across areas) (left) looks very different than conventional area based measure (right) in this example.
Availability or supply, adjusted for number of young children nearby

Two-stage floating catchment area measure:

1. For each provider, sum up the number of children under 5 with the travel time bandwidth (e.g., 20 minutes). Divide the provider’s capacity (number of slots) by the number of nearby children
   
   → Provider’s capacity to population ratio

2. For each family, sum up the (capacity to population) ratio for all providers within the travel time bandwidth around the family.
Adjusted supply measure: Local slots per local tot (Minnesota, 2015)

<table>
<thead>
<tr>
<th>Local slots per local tot</th>
<th>Statewide</th>
<th>Minneapolis-St Paul metro</th>
<th>Greater Minnesota</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any provider</td>
<td>0.558</td>
<td>0.509</td>
<td>0.636***</td>
</tr>
<tr>
<td>Percentage by type of provider</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC centers</td>
<td>0.407</td>
<td>0.558</td>
<td>0.212***</td>
</tr>
<tr>
<td>Family CC home</td>
<td>0.491</td>
<td>0.381</td>
<td>0.631***</td>
</tr>
<tr>
<td>Public providers</td>
<td>0.104</td>
<td>0.061</td>
<td>0.157***</td>
</tr>
</tbody>
</table>
Example: Map of Adjusted Supply in Hennepin and Ramsey Counties

- Each dot represents a family
- Red dots: Lower relative access
- Green dots: Higher relative access
Comparison of Area-Based and Distance-Based Measure of Adjusted Supply

AREA-BASED Slots per young child by census tract

DISTANCE BASED Adjusted supply averaged by census tract
Access is more than supply: Total cost to access nearby providers from family’s perspective

For each family-provider pair:

• **Money price of full-time care at that provider**
  • Weekly price for full-time care
  • Weighted average of provider’s infant, toddler & preschool prices

• **Travel-time cost for the family**
  • Based on driving time between the household location & the provider location
  • Cost of travel = travel time * 5 days * 2 trips * $10/hour

• **Total access cost** of full-time care for each family-provider pair = weekly money price + travel cost
## Total Access Costs and “Quality Premium”

How much more does it cost a family to access highly rated care (3 or 4-stars) compared to other market providers (who are either unrated or 1- or 2-star)?

<table>
<thead>
<tr>
<th>Total access costs (dollars per week)</th>
<th>Statewide</th>
<th>Minneapolis – St Paul metro area</th>
<th>Greater Minnesota</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly-rated market providers</td>
<td>234.3</td>
<td>274.2</td>
<td>170.6***</td>
</tr>
<tr>
<td>All other market providers</td>
<td>174.3</td>
<td>202.4</td>
<td>129.4***</td>
</tr>
<tr>
<td>Quality Premium (ratio)</td>
<td>1.359</td>
<td>1.372</td>
<td>1.344***</td>
</tr>
</tbody>
</table>
High-Quality Premium Heat Map: State House Districts

What is the premium on high quality child care for MN families?

High quality care comes at a premium for Minnesota families - but how much? Select a state house district below to explore why some families have more costly access than others to quality care for their children, considering both provider price and travel time cost.

State house districts

Percentile - quality-care premium

What does this look like for this district?

Please select a single state house district on the map for a summary.

What is contributing to this premium?

Drive time to closest provider in the district (avg. in minutes)

Weekly price for closest provider in the district (avg. $)


ST. PAUL OFFICE: 10 Yorkton Court Saint Paul, MN 55117 - 1065 Phone: 651-641-0305 Fax: 651-645-0990

MINNEAPOLIS OFFICE: 2221 East Hennepin Avenue Suite 220 Minneapolis, MN 55413 - 1754 www.ThinkSmall.org
High-Quality Premium Heat Map: State House Districts

What is the premium on high quality child care for MN families?

High quality care comes at a premium for Minnesota families - but how much? Select a state house district below to explore why some families have more costly access than others to quality care for their children, considering both provider price and travel time cost.
High-Quality Premium Heat Map: State House Districts

Main mapping feature

State house districts

Percentile - quality-care premium
- 0-20th
- >20-40th
- >40-60th
- >60-80th
- >80-100th

What is the premium on high quality child care for MN families?

ST. PAUL OFFICE: 10 Yorkton Court...er Measures to Early Care and Education. State house districts...
High-Quality Premium Heat Map: State House Districts

What does this look like for this district?
Please select a single state house district on the map for a summary

What is contributing to this premium?
- Statewide Highly Rated provider average
- Statewide Other provider average

Drive time to closest provider in the district (avg. in minutes)

Weekly price for closest provider in the district (avg. $)
High-Quality Premium Heat Map: State House Districts

What is the premium on high quality child care for MN families?

High quality care comes at a premium for Minnesota families - but how much? Select a state house district below to explore why some families have more costly access to quality care for their children, considering both provider price and travel time cost.

Percentile - quality-care premium

- 0-20th
- >20-40th
- >40-60th
- >60-80th
- >80-100th

What does this look like for this district?

On average for families in district 03A, full-time care at the highly-rated provider closest to them costs 108.7% more than at the closest other provider in the district.

What is contributing to this premium?

| = Statwide Highly Rated provider average
| = Statwide Other provider average

Drive time to closest provider in the district (avg. in minutes)

Highly Rated Other

Weekly price for closest provider in the district (avg. $)

Highly Rated Other

High-Quality Premium Heat Map: State House Districts

Percentile - quality-care premium

Use-case example: House District 03A
What is the premium on high quality child care for MN families?

High quality care comes at a premium for Minnesota families - but how much? Select a state house district below to explore why some families have more costly access than others to quality care for their children, considering both provider price and travel time cost.

What does this look like for this district?
On average for families in district 03A, full-time care at the highly-rated provider closest to them costs 108.7% more than at the closest other provider in the district.

What is contributing to this premium?

- Statewide Highly Rated provider average
- Statewide Other provider average

Drive time to closest provider in the district (avg. in minutes):

Highly Rated Other

Weekly price for closest provider in the district (avg. $):

Highly Rated Other
What does this look like for this district?

On average for families in district 03A, full-time care at the highly-rated provider closest to them costs 108.7% more than at the closest other provider in the district.
High-Quality Premium Heat Map: State House Districts

What is contributing to this premium?

| = Statewide Highly Rated provider average
| = Statewide Other provider average

Drive time to closest provider (avg. in minutes)

<table>
<thead>
<tr>
<th>Highly Rated</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

Weekly price for closest provider (avg. $)

<table>
<thead>
<tr>
<th>Highly Rated</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>$300</td>
<td>$100</td>
</tr>
</tbody>
</table>
Next Steps

- Additional disaggregations:
  - Provider type (setting)
  - Geographic boundaries

- Additional data points:
  - Share of supply
    - a ratio of nearby slots by Family/Center care for the “average family”
      - Ex: 60% of the nearby slots are in Centers and 40% are in Family Care)
  - Trend data

- Continuous user interface and design improvements
FOR MORE INFORMATION

Family-Centered Measures of Access to Early Care and Education

Elizabeth Davis, Won Fy Lee, and Aaron Sojourner

IZA Discussion Paper No. 11396

Forthcoming in Early Childhood Research Quarterly (2018)
Appendix
Data Sources

• Providers
  • NACCRRAware database of licensed providers in MN 2011-’17. Includes address, capacity, price by child age
  • Parent Aware (QRIS) quality rating
    • Unrated or low rated (1-2 star)
    • High-rated (3-4 star)

• Families with young children: Census
  • Number of children under age 5 (block level)
  • Number by income & race/ethnicity groups (CT)
Spatial distribution of families and providers used in 2015 analysis

Synthetic Families

Minnesota ECE Providers

Source: ACS 2010-2014 5% sample

Source: NACCRAware database