Developing Rational Service Areas (RSAs) for Healthcare Services Using Medicaid Claims Data in New York

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The Center for Health Workforce Studies (CHWS) — established in 1996—is an academic research center based at the School of Public Health at the University at Albany, State University of New York (SUNY)

Mission: To provide timely, accurate information and conduct policy-relevant research about the health workforce

Goal: To assist health, professional, and educational organizations, policy makers, planners, and other stakeholders to understand issues related to the supply, demand, distribution, and the use of health workers
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NY’s Approach on RSAs

- RSAs are geographic areas that represent how and where the population residing within that area “reasonably” seek certain health services.

- RSAs should account for:
  - **Commuting Patterns**
    - Location of Patient/Provider
    - Patient flow
  - **Physical barriers**
    - Highways/Transportation
    - Mountains
    - Bodies of water
  - **Individual characteristics**
    - Demographics e.g. age, race, culture
    - Insurance status
## RSAs Development in NY

<table>
<thead>
<tr>
<th>RSAs Project</th>
<th># of RSAs</th>
<th>Time</th>
<th>Data Source</th>
<th># of Claims</th>
<th>Provider Type</th>
<th>Needs Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Care</td>
<td>277</td>
<td>2014~15</td>
<td>NY Medicaid Claims, 2013 Outpatient</td>
<td>6.3M</td>
<td>PC Physician</td>
<td>Rank each indicator &amp; combine</td>
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<tr>
<td>Dental Health</td>
<td>178</td>
<td>2016~17</td>
<td>2015 General dentistry</td>
<td>1.9M</td>
<td>Dentist Inc. Ped.</td>
<td>Composite Indicator (CI) ranking</td>
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<tr>
<td>Mental Health</td>
<td>107</td>
<td>2017~18</td>
<td>2017 MH services with ER</td>
<td>0.3M</td>
<td>Physician NP &amp; PA</td>
<td>Improved CI with Pop Density</td>
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</table>
Primary Care RSAs in NY

Western NY PC RSAs

NY City PC RSAs

*RSA – Zip code area with same color
*Large RSA means longer travel distance based on Patients’ commuting patterns
Dental and Mental RSAs in NY

* Dental vs Mental (N=178 vs n=107)
* Downstate vs Upstate or Urban vs Rural
* RSAs span across geo-political areas - e.g. central NY, capital region

www.chwsny.org
Develop RSAs - NY Data

Platform: NYS Medicaid SIM Data Warehouse

- Record level claims for 4m+ patients
- Customizable view by patient/provider/claim type

<table>
<thead>
<tr>
<th>Pt. CIN</th>
<th>Age</th>
<th>Sex</th>
<th>Race</th>
<th>Home Zip</th>
<th>Provider NPI</th>
<th>Service Date</th>
<th>Procedure Code</th>
<th>Service Place</th>
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<td>64</td>
<td>M</td>
<td>White</td>
<td>10001</td>
<td>10-digit</td>
<td>5/2/17</td>
<td>XXXX</td>
<td>Hospital</td>
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</tbody>
</table>

Key for RSAs:

- Ability to link patient zip and provider zip
- Patient flow volume – # of claims
- Filters for provider/service type and place
Develop RSAs - Steps

1. Patient-Provider Matrices
2. Spatial/GIS Analysis
3. Social Network Analysis
4. RSAs Mapping
5. RSAs Revision
1. Patient-Provider Matrices

Count-based Matrix
- Patient zip (row) by provider zip (column) – 1600x900
- Cell value – paired total claims

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<td>55</td>
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<td>0</td>
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</tr>
</tbody>
</table>

Relational Matrix
- **Plurality** - highest percent of patients from one zip code obtained services in certain provider zip code(s)
- **1s** - plurality patient flow relationship
- **0s** – non-plurality
2. Spatial/GIS Analysis

Spatial Analysis with ArcGIS

- Boundaries created following roads/speed limits from providers
- “Cookie Cutter” was used to generate final relational matrix
3. Social Network Analysis (SNA)

**UCINET cluster analysis** (two-mode and n-cliques technique)
- Visualize matrix structure among zip codes (GTL method)
- 11 NYS regional networks created based on initial RSA subgroups

![Adirondack Region Mental Patient-Provider Network](image.png)
3. Social Network Analysis (SNA)
4. Mapping Initial RSAs

- **Zip codes** were grouped based on SNA
- **ArcGIS** mapping initial RSAs
- **Irrational Areas** identified

**Adirondack Region Initial Dental RSAs**

- Structure holes and enclosed RSAs
- Undetermined areas
- Areas excluded by 60-minute traveling rule
- Irrational area data revisited following the next highest plurality
5. Revising and finalizing RSAs

RSA Revision Rules:

- Contiguousness
- Non-overlapping
- Removing “cookie cutters”
- Reasonable locales

- 178 Revised Dental RSAs statewide finalized
Findings

• Traveling patterns for NYS Medicaid patients do not follow geo-political boundaries, but follow actual supply of available providers and means of transportations

• RSAs in rural areas were larger and tended to be composed of more zip codes, compared to those in urban areas

• RSAs in upstate NY were also larger than in downstate NY, which indicated a longer travel distance for upstate Medicaid patients seeking healthcare services

• In New York City and other major metropolitan areas, RSAs were more localized and smaller than other regions, resulting from a larger number of providers and greater accessibility to public transportation
Next Step – Assess RSAs

Three sets of RSAs created to help --
• Understanding Medicaid patients’ travel patterns
• Visualize and compare the access to care issue statewide, especially in underserved areas

Needs Assessment is the next --
• Assess RSAs for different healthcare services based on certain criteria/indicators
• Identify areas with highest need to inform policy makers
• Needs assessments for three RSAs were conducted with improvements overtime on ranking methods
Questions?

• For more information, please email me at:
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