

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

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# Center for Health Workforce Studies

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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

# Acknowledgement

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# NY's Approach on RSAs

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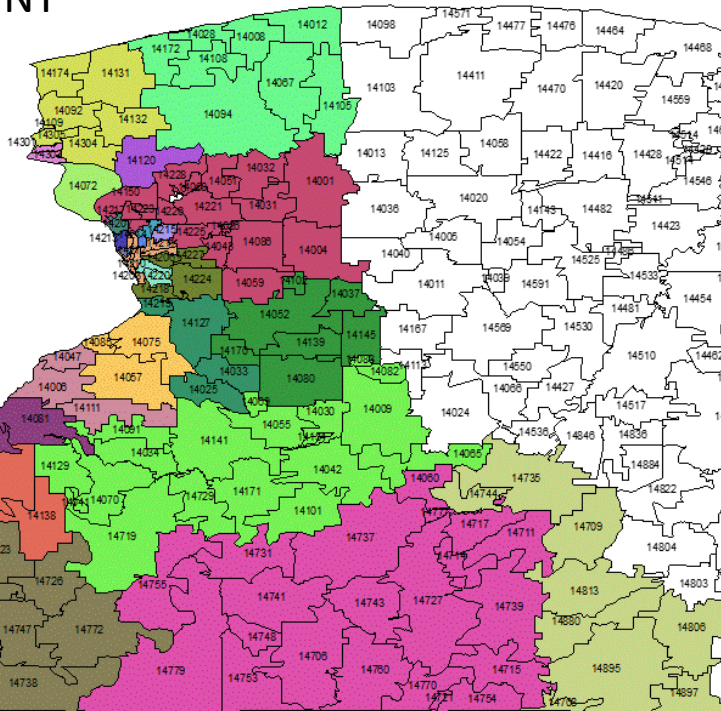
- **RSAs are geographic areas that represent how and where the population residing within that area “reasonably” seek certain health services**
- RSAs should account for:
  - **Commuting Patterns**
    - Location of Patient/Provider
    - Patient flow
  - **Physical barriers**
    - Highways/Transportation
    - Mountains
    - Bodies of water
  - **Individual characteristics**
    - Demographics e.g. age, race, culture
    - Insurance status

# RSAs Development in NY

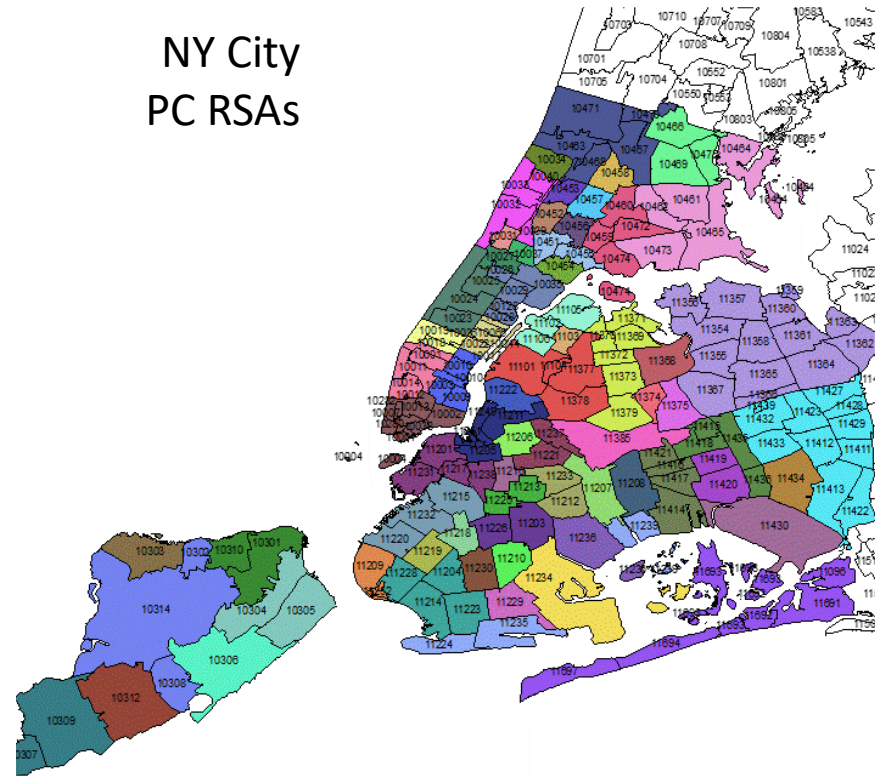
RSAs Project	# of RSAs	Time	Data Source	# of Claims	Provider Type	Needs Assessment
Primary Care	277	2014 ~15	NY Medicaid Claims, 2013 Outpatient	6.3M	PC Physician	Rank each indicator & combine
Dental Health	178	2016 ~17	2015 General dentistry	1.9M	Dentist Inc. Ped.	Composite Indicator (CI) ranking
Mental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

# Primary Care RSAs in NY

Western NY  
PC RSAs



NY City  
PC RSAs

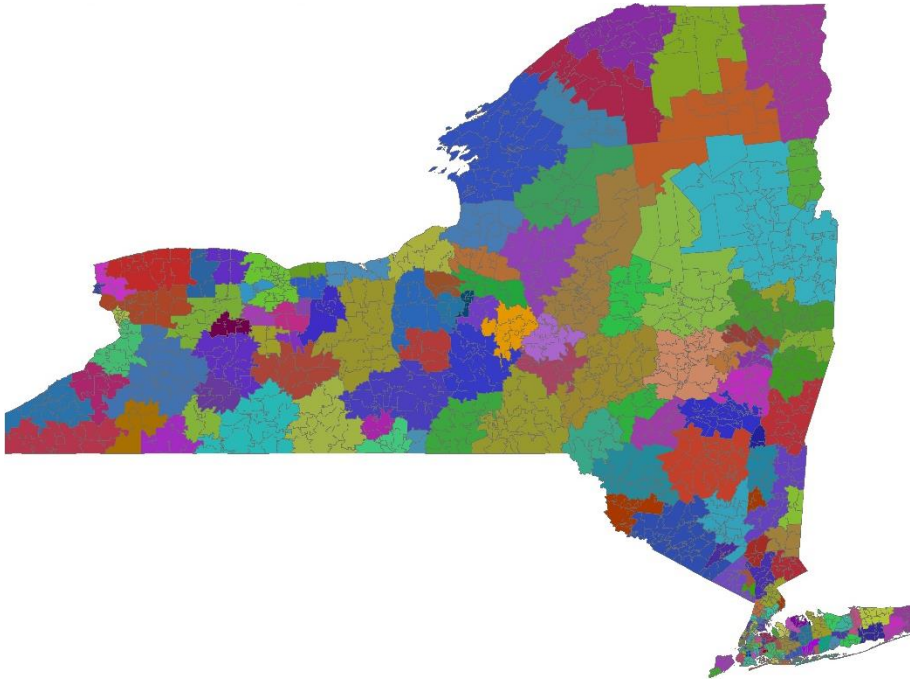


\*RSA – Zip code area with same color

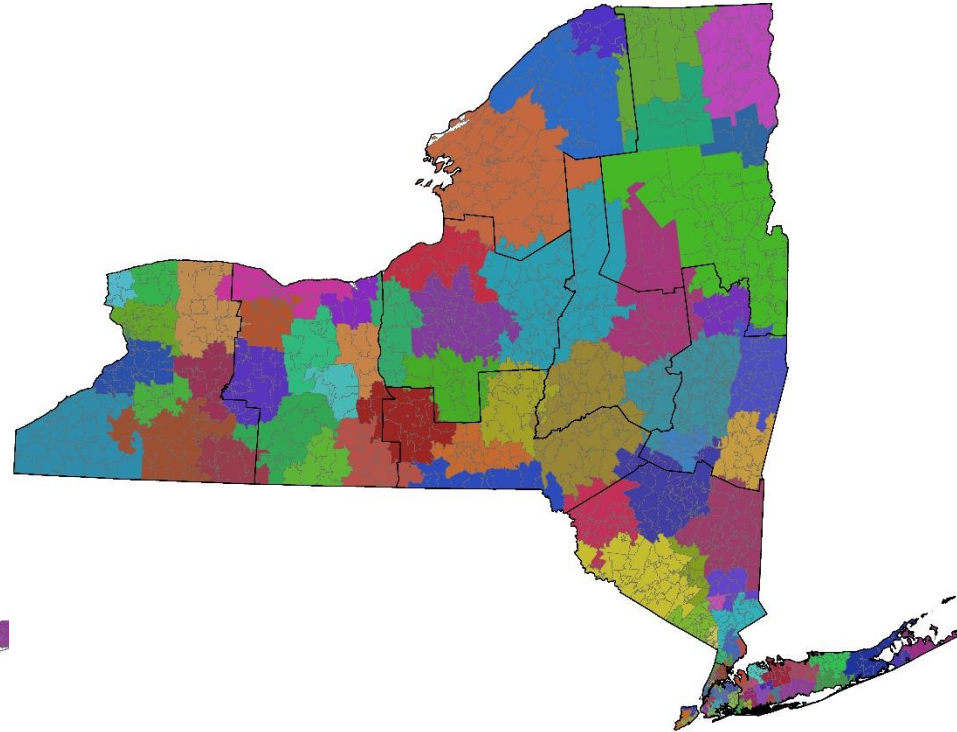
\*Large RSA means longer travel distance based on Patients' commuting patterns

# Dental and Mental RSAs in NY

Dental Health RSAs



Mental Health RSAs



\*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

# Develop RSAs - NY Data

## Platform: NYS Medicaid SIM Data Warehouse

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

Pt. CIN	Age	Sex	Race	Home Zip	Provider NPI	Service Date	Procedure Code	Service Place	Service Zip
0001	64	M	White	10001	10-digit	5/2/17	XXXX	Hospital	10002

## 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

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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

### Example of Matrices in NYC

Count-Based Matrix					Relational Matrix				
Zip Code	10001	10002	10003	10004	Zip Code	10001	10002	10003	10004
10001	160	55	0	10	10001	1	0	0	0
10002	212	4194	1	106	10002	0	1	0	0
10003	51	70	0	1	10003	0	1	0	0
10004	0	2	0	8	10004	0	0	0	1

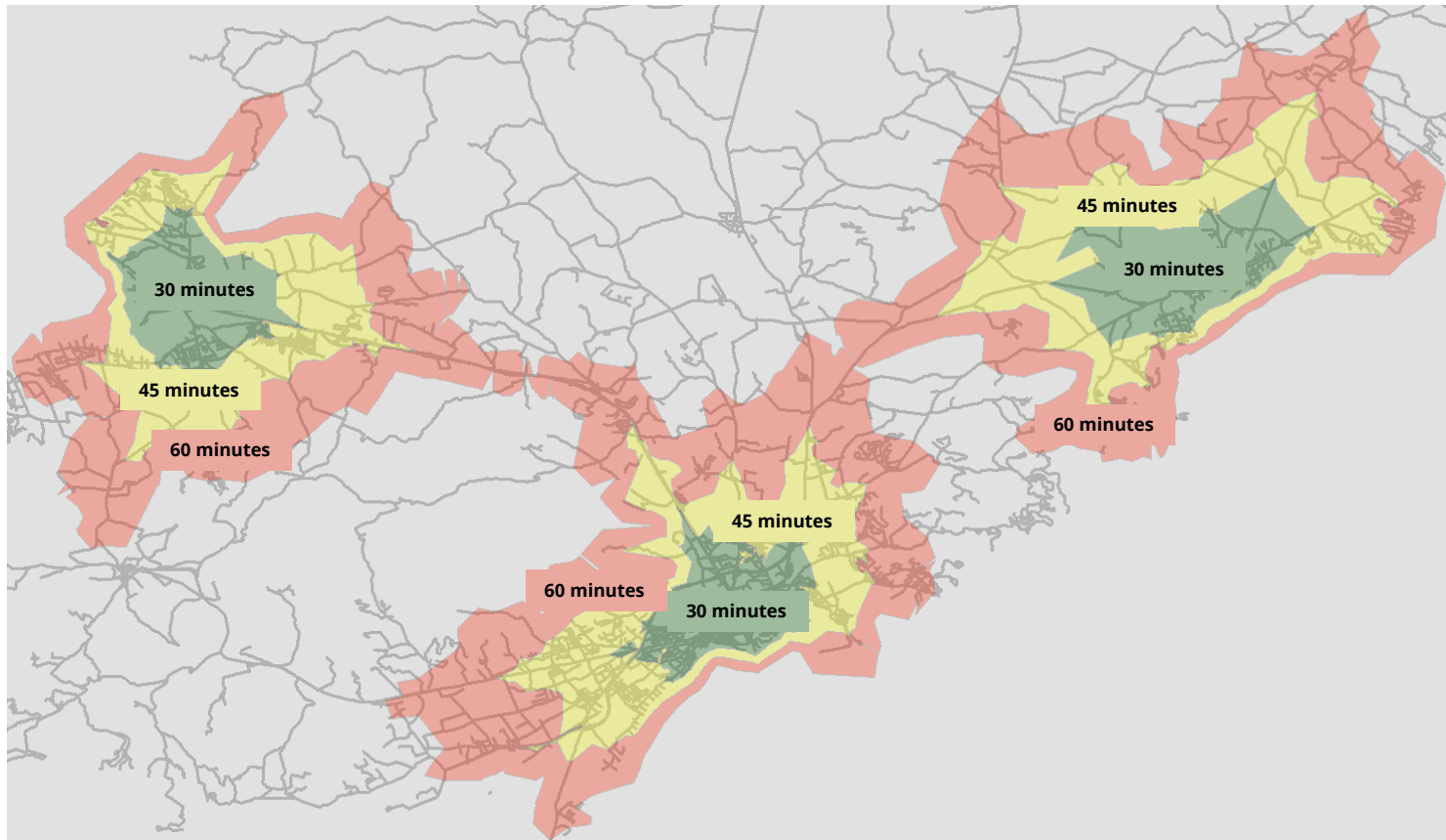
## Relational Matrix

- **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

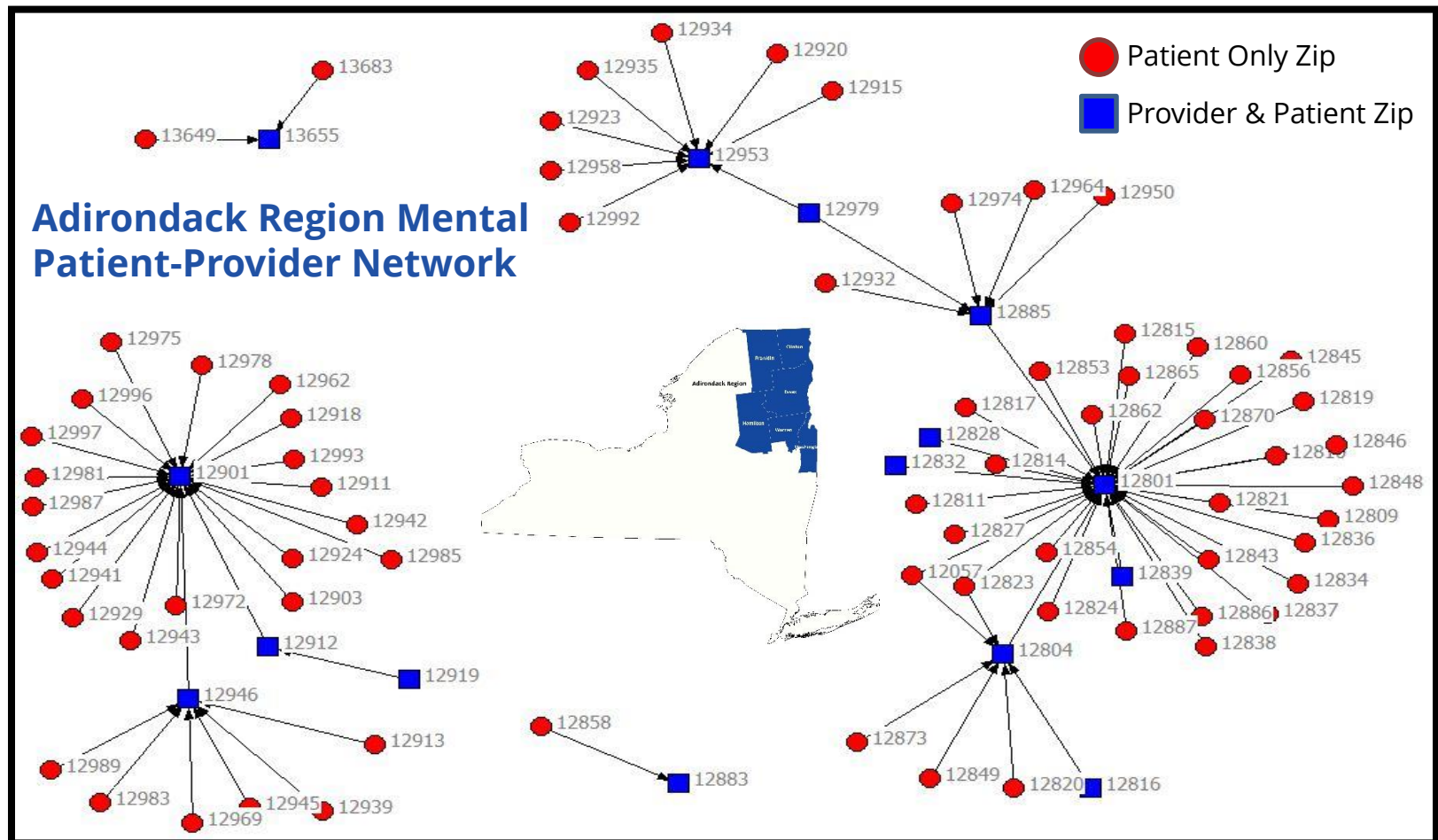
- Boundaries created following roads/speed limits from providers
- “Cookie Cutter” was used to generate final relational matrix



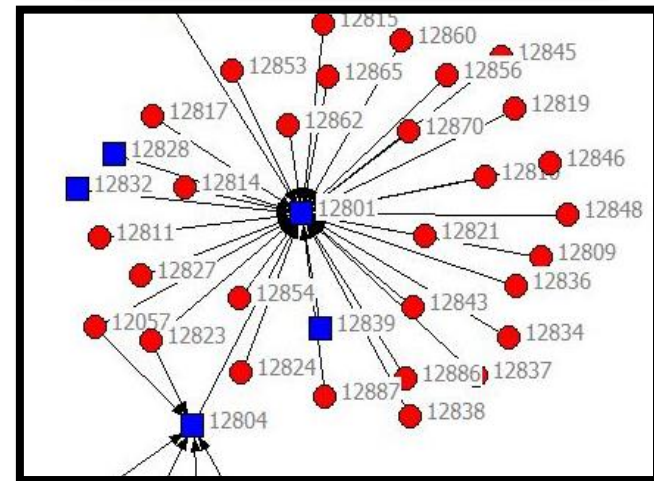
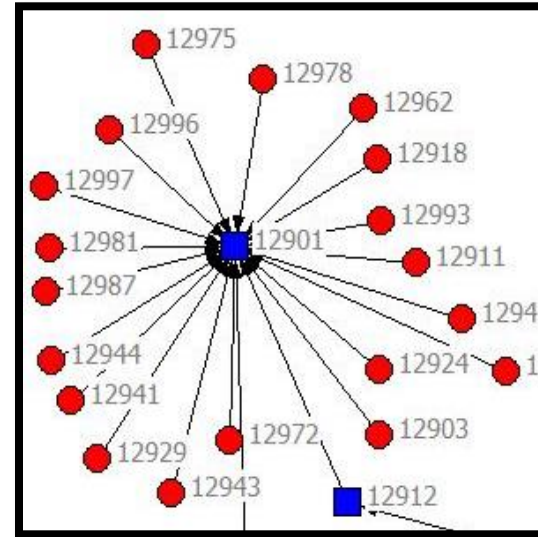
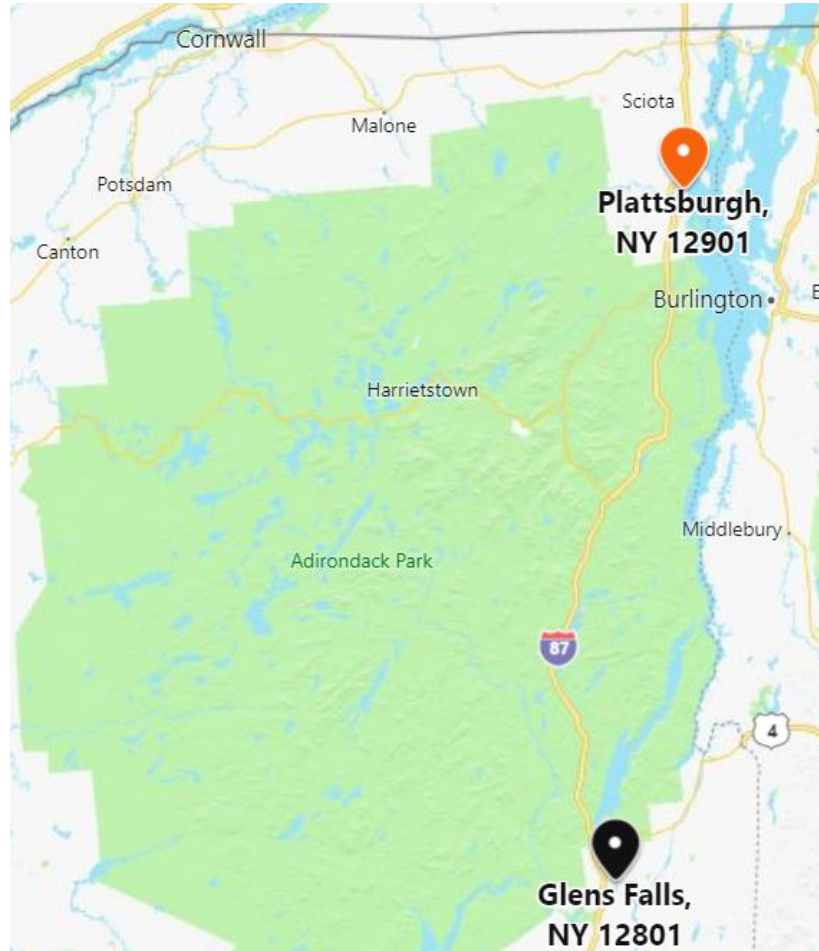
# 3. Social Network Analysis (SNA)

## 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



# 3. Social Network Analysis (SNA)

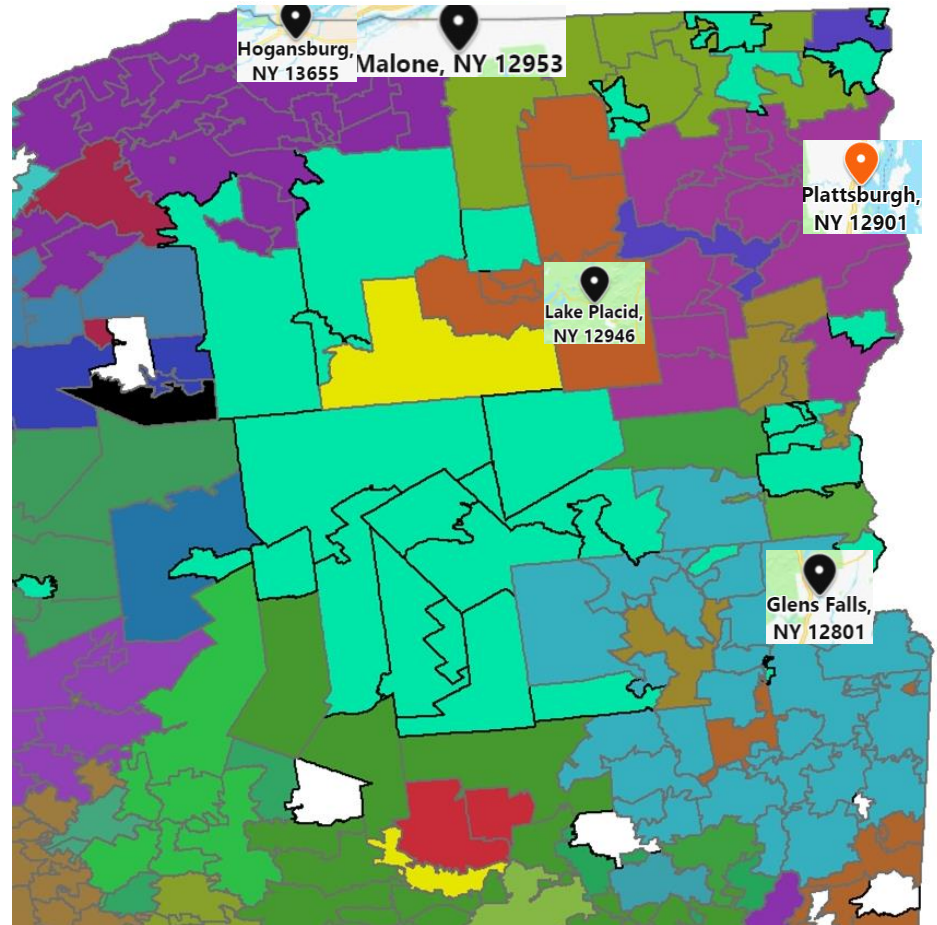


# 4. Mapping Initial RSAs

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

## Adirondack Region Initial Dental RSAs

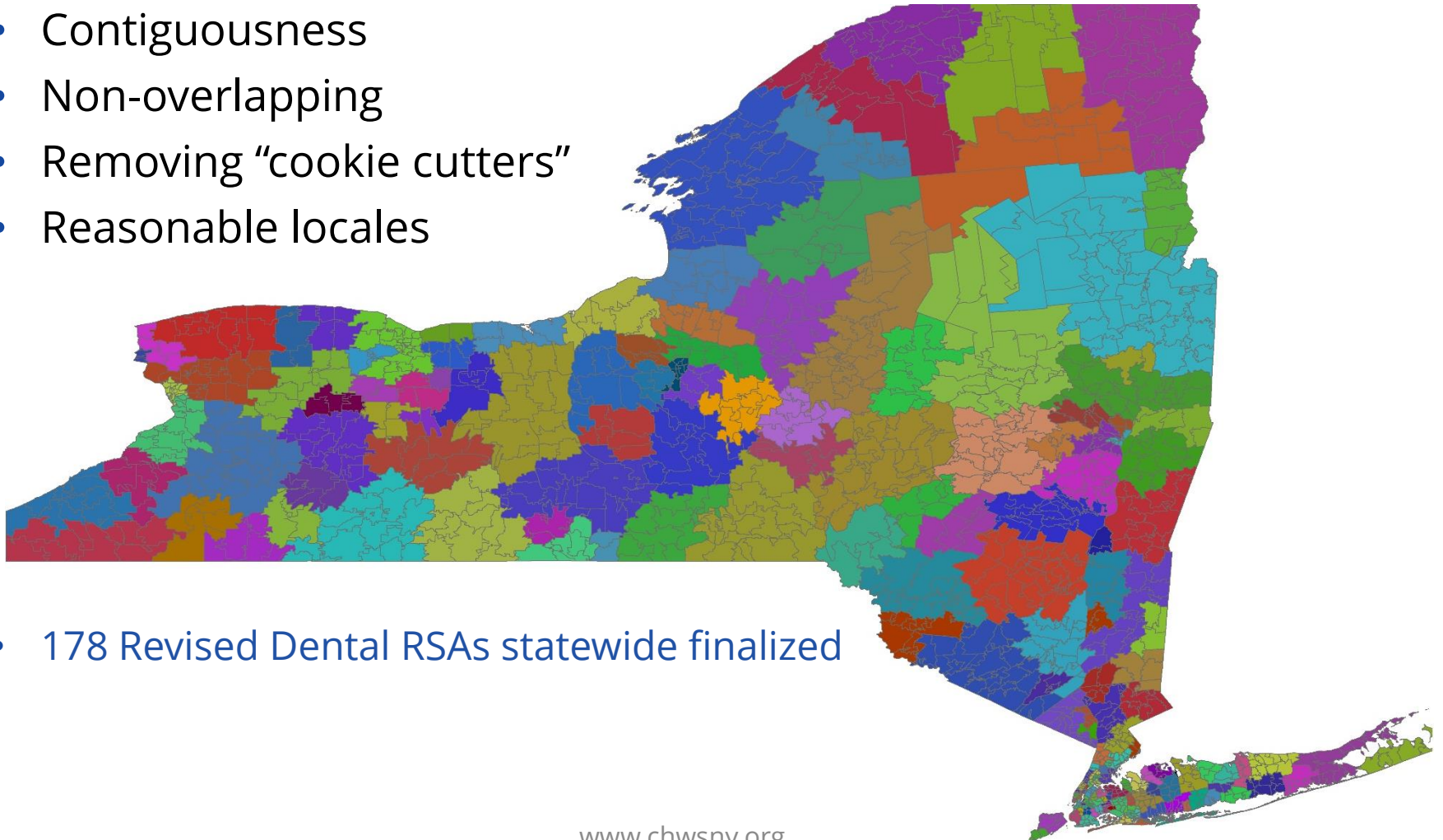
- Structure holes and enclosed RSAs
- Undetermined areas
- Areas excluded by 60-minute traveling rule
- Irrational area data revisited following the next highest plurality



# 5. Revising and finalizing RSAs

## RSA Revision Rules:

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



- 178 Revised Dental RSAs statewide finalized

# Findings

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- 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

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**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?

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