Developing and Assessing Oral Health Rational Service Areas (RSAs) Using Medicaid Claims Data in New York State

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The Center for Health Workforce Studies at SUNY Albany School of Public Health

- Established in 1996
- Based at the UAlbany School of Public Health
- Committed to collecting and analyzing data to understand workforce dynamics and trends
- Goal to inform public policies, the health and education sectors and the public
- Other contributors: Jean Moore and Guy Forte

Access to Oral Health - What's the Problem?

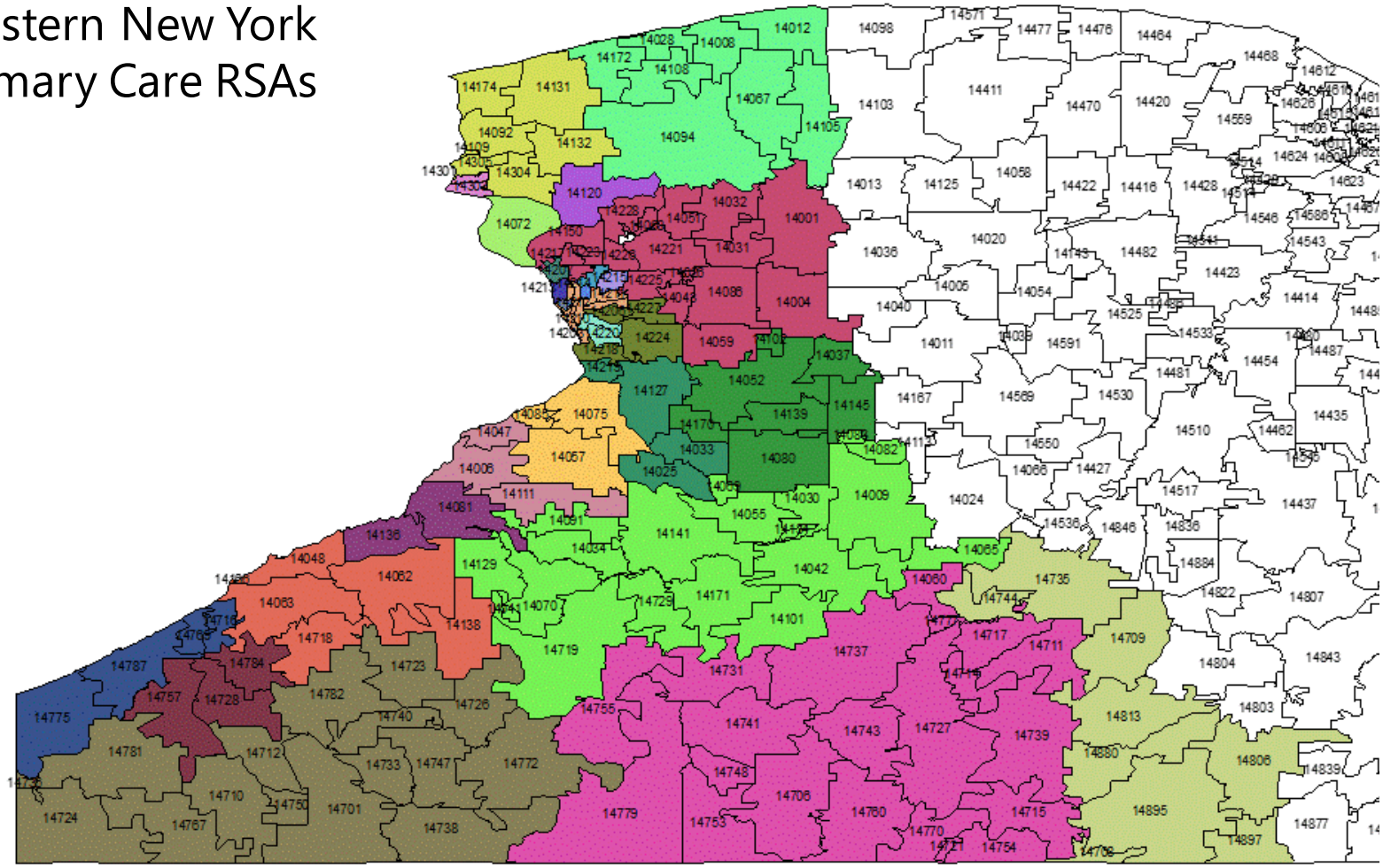
- **What is Happening in the Real World?**
  - Developing strategies to improve access to oral health services requires an understanding of patients' care seeking patterns and their access barriers, especially for underserved populations
- **Workforce Maldistribution**
  - While NY has an abundant supply of dentists, they are not well distributed geographically, e.g. Upstate versus Downstate
- **Insurance Status**
  - Access may be limited for publicly-insured (Medicaid) patients since many dentists in NY do not accept Medicaid
- **Commuting Patterns**
  - Analyzing patterns can assist in the identification of areas where patients commute further, reflecting more limited access, and to create *rational service areas (RSAs)*

Rational Service Areas (RSAs) Are a Key Component of Federal Shortage Area Designations

- **RSAs are geographic areas that represent how and where the population residing within that area "reasonably" seeks certain health services**
- RSAs must account for:
  - **Physical barriers** that can limit access to available providers
    - highways
    - mountains
    - bodies of water
  - **Individual characteristics** that can limit access to available providers
    - culture
    - transportation, and
    - insurance status

Example of Rational Service Areas (RSAs)

Western New York
Primary Care RSAs



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Why Developing and Assessing Oral Health RSAs Using Medicaid Claims Data?

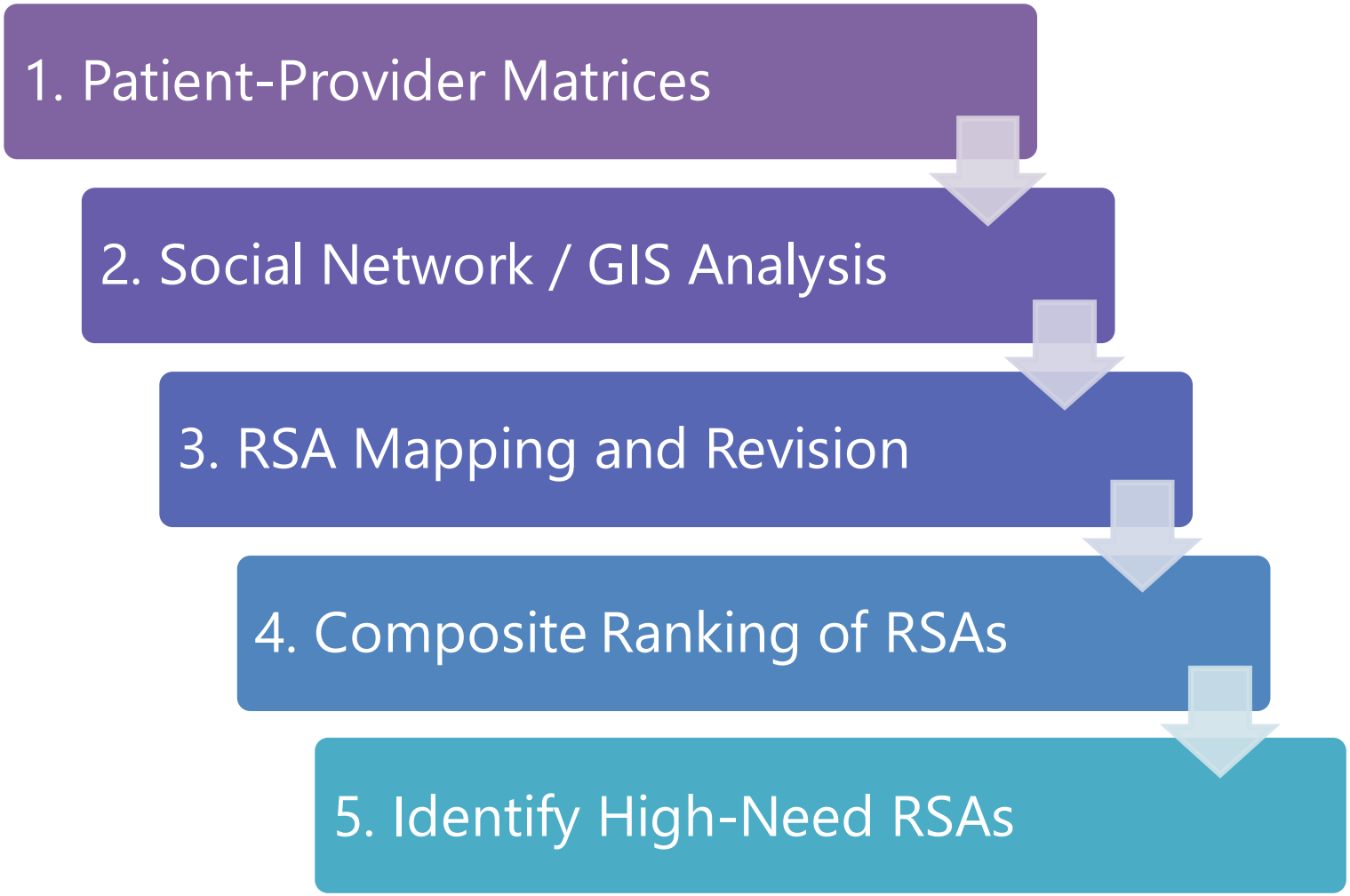
- **Reveal the Reality** - while county, region, and state are preferred geographic units, patients often seek oral health care across these geo-political boundaries
- **Make Available Data Talk** - analyzing claims data provides an accurate assessment of Medicaid patients' commuting patterns for oral care at the zip code level
- **Targeting High-Need RSAs**
  - Rank oral health RSAs based on important indicators
  - Facilitates the targeting of resources to neediest areas
  - Recruitment and retention incentives
  - Program development/expansion

Data Preparation

2015 NYS Medicaid claims data (12 months)

- Source: NYS Medicaid Data Warehouse
- # of claims included: **1,864,329**
- General dentists only (FFS and capitation)
- CPT codes for general oral health services
- Zip code level - pairing patient zip codes with provider zip codes
- Excluded emergency department visits
- Excluded out of NYS claims (except bordering cases)

Steps to Assessing Oral Health RSAs



1. Patient-Provider Relational Matrices

- **Matrices** (1960 x 677 zip codes)
  - Reflecting ties / patient flows between patients and providers at the zip code level
- **Plurality**
  - The highest percent of patients from one zip code went for their oral care in certain provider zip code(s)

Example of Relational Matrices in New York City

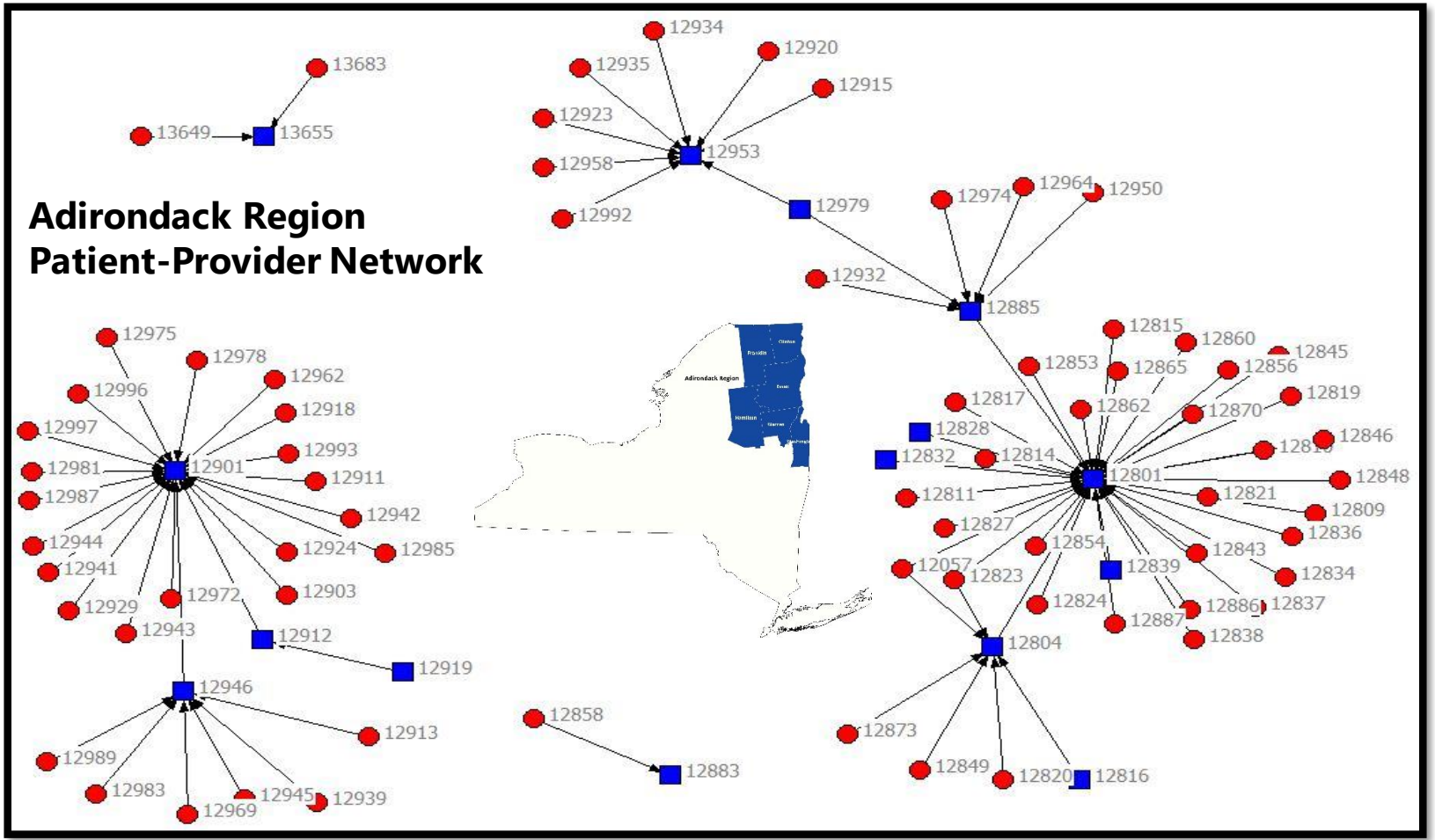
- Count-based matrix based on claims between zip code pairs
- Relational matrix based on plurality patient flow

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

Relational Matrix				
Zip Code	10001	10002	10003	10004
10001	1	0	0	0
10002	0	1	0	0
10003	0	1	0	0
10004	0	0	0	1

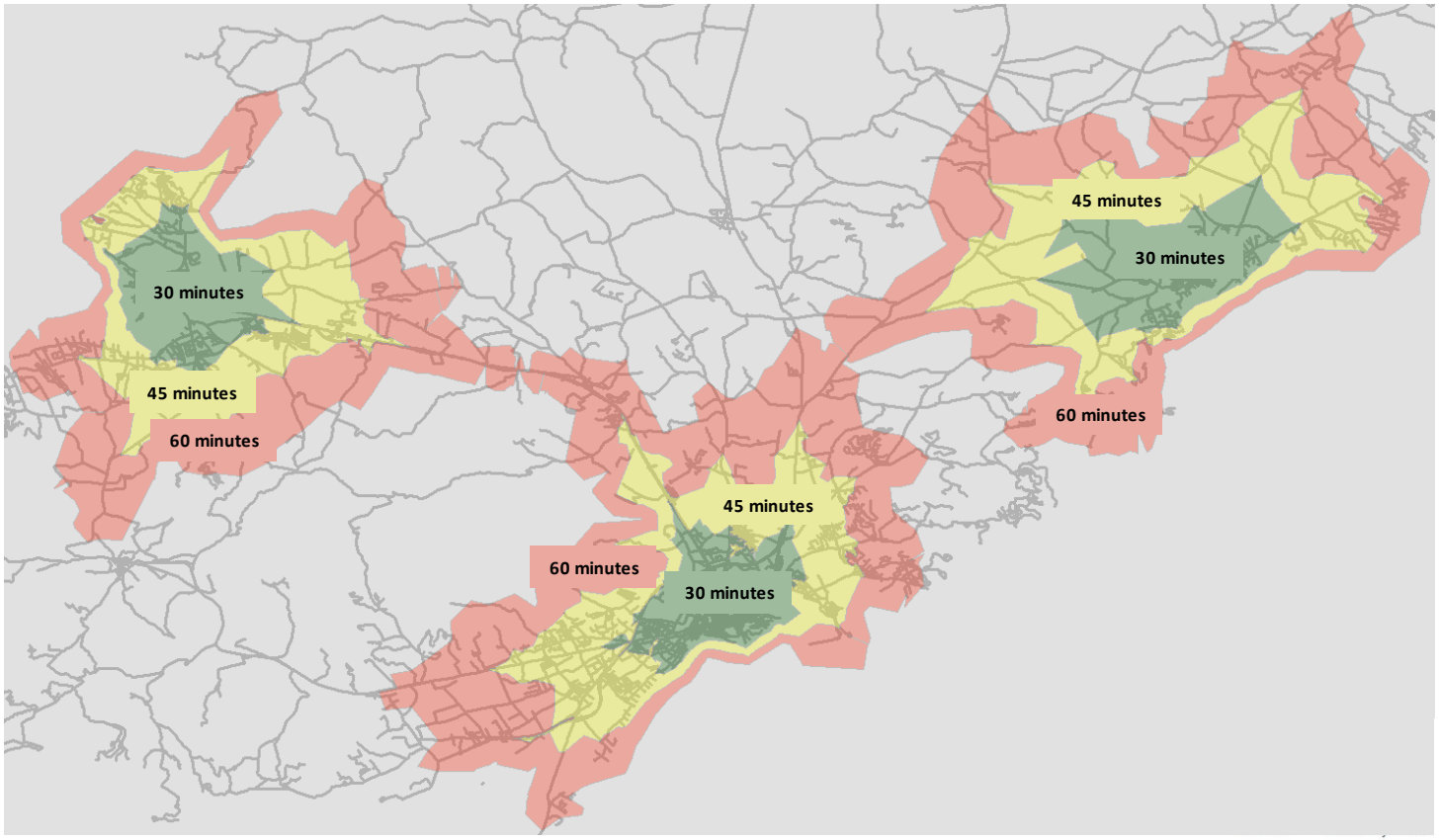
2. Social Network Analysis / Mapping

- **Mapping with UCINET/NetDraw** (one-mode analysis)
  - Identified relationship among zip codes (nodes/actors)
  - Created oral health rational service networks for 11 NYS regions



2. GIS Analysis / Mapping Initial RSAs

- **Spatial Analysis with ArcGIS**
  - Traveling time limited to **60 minutes** following roads and speed limits
  - GIS Network analysis generating "cookie cutters" for zip code pairs

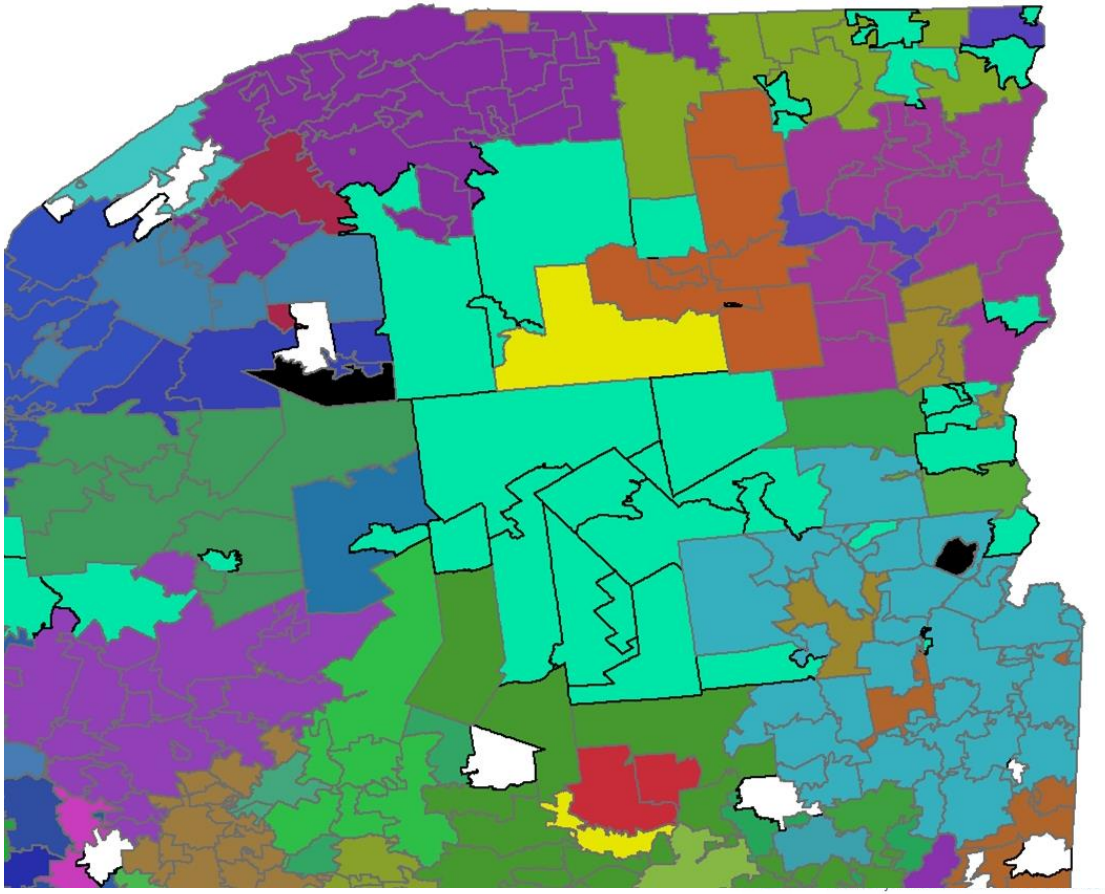


2. GIS Analysis / Mapping Initial RSAs

- Mapping patient-provider networks, breaking regional boundaries
- **285** Initial RSAs were created statewide

Adirondack Region Initial Oral Health RSAs

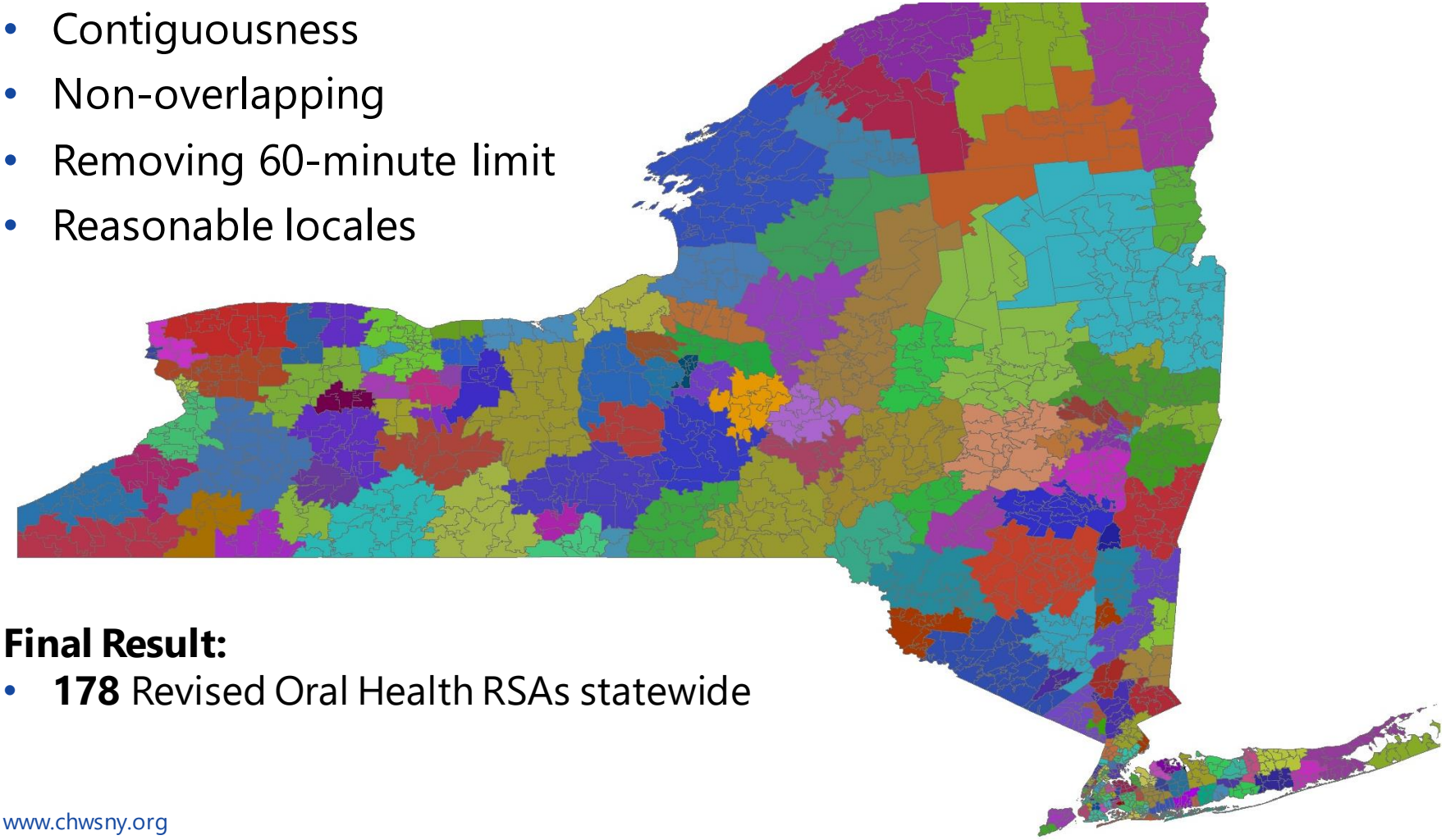
- Not very rational
- Holes and enclosed RSAs
- Undetermined areas
- Areas excluded by 60-minute traveling rule
- Need revision



3. Revised RSAs Based on HRSA Guidelines

RSA Revision Rules:

- Contiguousness
- Non-overlapping
- Removing 60-minute limit
- Reasonable locales



Final Result:

- **178** Revised Oral Health RSAs statewide

4. RSA Needs Assessment

Based on literature reviews, we used 6 demographic & 4 health indicators to determine relative need for each RSA

- **Demographic Indicators** (ACS 2015 data)
  - Percent of people Under 200% Poverty Level
  - Percent of racial/ethnic minorities
  - Percent of people who speak a language other than English at home
  - Percent of people enrolled in Medicaid
- **Health Indicators** (NYS Medicaid/Department of Health 2015 data)
  - Dental ER visits Per 10,000 Medicaid enrollees
  - Dental caries for Medicaid enrollees under age 18 per capita
  - Number of oral health providers per 10,000 Medicaid enrollees
  - Dental visits to primary care providers per 10,000 Medicaid enrollees
  - Percent of low birth weight
  - Percent of preterm birth

4. Needs Assessment - Composite Indicator

Construct a Composite Indicator (CI) to Rank RSAs

- **Why using a CI?**
  - popularity, methodologically feasible, easy interpretation for stakeholders
- **Steps for CI ranking:**
  1. Transformed data for 10 indicators at the zip code level
  2. Correlation and outlier testing among 10 indicators
  3. Aggregated data for 178 revised RSAs after statistical corrections
  4. Two types of normalization methods, Z-score and Min-Max, were conducted
  5. Two weighting methods, equal weighting (EW) and principal components analysis (PCA), were applied
  6. Four CI ranking scores were generated by mix-matching normalization and weighting methods
  7. Robustness analysis tested on the average shift in rankings
  8. A final CI ranking from 1 to 178 were presented

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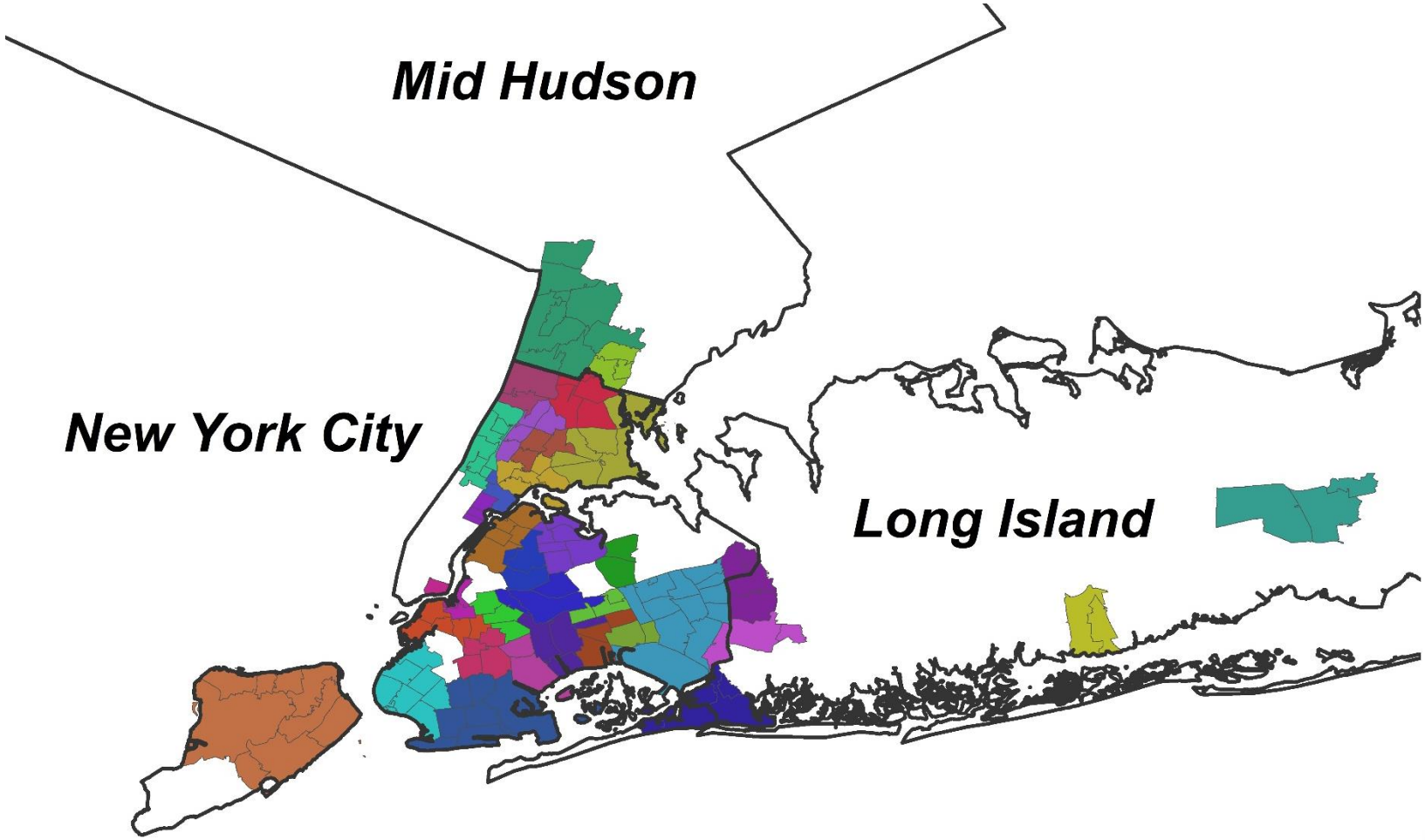
5. Identifying High-Need Oral Health RSAs

Composite Indicator Ranking for 20 Highest Need RSAs in NY

RSA#	1. EW_Z-score	2. EW_MM	3. PCA_Z-score	4. PCA_MM	AbtDiff	High Need Rank	Region
25	1	1	1	1	0	**1**	New York City
8	4	2	2	2	2	**2**	New York City
32	5	3	3	3	2	**3**	New York City
60	3	4	4	4	1	**4**	New York City
96	2	5	5	5	3	**5**	Capital Region
18	6	6	6	6	0	**6**	New York City
26	8	7	7	7	1	**7**	New York City
21	9	8	9	8	1	**8**	New York City
61	7	9	8	9	2	**8**	New York City
65	10	10	10	11	1	**10**	New York City
17	12	11	11	10	2	**11**	New York City
62	11	12	13	13	2	**12**	New York City
31	16	13	15	12	4	**13**	New York City
30	18	14	17	15	4	**14**	New York City
157	14	19	12	18	7	**14**	Western New York
117	13	15	18	20	7	**16**	Central New York
4	15	20	14	19	6	**16**	Mid Hudson
156	17	18	16	17	2	**16**	Western New York
5	22	16	20	16	6	**19**	New York City
7	27	17	19	14	13	**19**	New York City

5. Identifying High-Need RSAs in Downstate NY



Findings

- Traveling patterns for NYS Medicaid patients do not follow geo-political boundaries, but follow actual supply of available dentists 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 oral health 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

Findings: Most of the High-Need Oral Health RSAs are in New York City and Capital Region

RSAs ranked in the first quartile were considered High-Need RSAs

PHIP Region	# of Oral Health RSAs	# of High Need RSAs	% of High Need RSAs
Capital Region	14	4	29%
Central New York	15	1	7%
Finger Lakes	17	1	6%
Long Island	27	3	11%
Mid Hudson	22	3	14%
Mohawk Valley	4	0	0%
New York City	43	30	70%
North Country	5	0	0%
Southern Tier	8	0	0%
Tug Hill Seaway	5	0	0%
Western New York	18	2	11%
New York State	**178**	**44**	**25%**

Findings: Most of the High-Need Oral Health Zip Codes are in Downstate New York

Zip codes that were covered under high-need RSAs were considered Oral Health High Need Zip Codes

PHIP Region	# of Zip Codes	# of Zip Codes in High Need RSAs	% of Zip Codes in High Need RSAs
Capital Region	148	22	15%
Central New York	143	11	8%
Finger Lakes	156	8	5%
Long Island	163	12	7%
Mid Hudson	260	23	9%
Mohawk Valley	80	0	0%
New York City	186	131	70%
North Country	113	0	0%
Southern Tier	87	0	0%
Tug Hill Seaway	82	0	0%
Western New York	193	19	10%
New York State	**1,611**	**226**	**14%**

Next Steps

- **Work with State DOH**
  - Finalize statewide set of oral health RSAs
  - Identify high need areas with the most limited access to oral health services
    - Consider both high need indicators and local circumstances
  - Prepare OH shortage designation requests, starting with neediest areas
  - Work with local stakeholders
    - Review outcomes of designation submissions
    - Explore possible strategies to expand access to oral health services
      - Integration with primary care
      - Developing community based oral health programs
      - Using technology, i.e., teledentistry

Questions?

For more information, please email me at:

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