

# Part 1: Translating SDoH into Tangible Data

Geocoding, Heat Maps, Z-Codes, Oh My!

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# Hosts



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# Social Determinants of Health Basic Concepts

# Social Determinants of Health (SDOH)

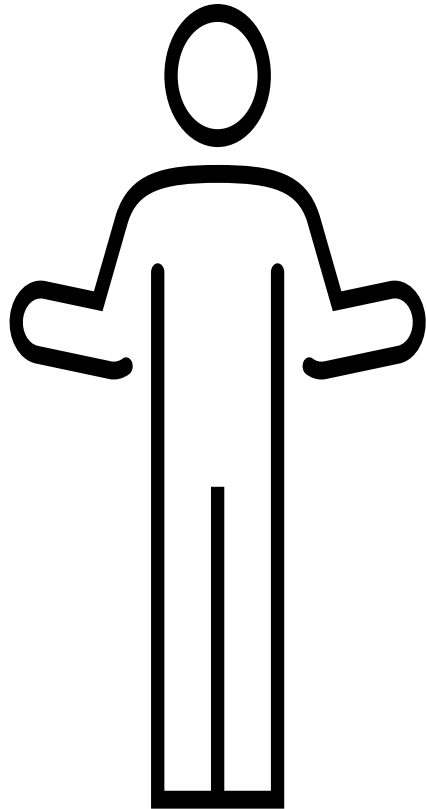
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Conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. – *World Health Organization*





# What Determines your Health



**40%**

## **Socioeconomic Factors**

Education, Job Status, Family Support, Income

**10%**

## **Physical Environment**

Housing

**30%**

## **Health Behaviors**

Tobacco Use, Alcohol Use, Exercise

**20%**

## **Health Care**

Access & Quality of Care

Source: National Academy of Medicine: <https://nam.edu/social-determinants-of-health-101-for-health-care-five-plus-five/>

# Examples of SDOH Domains

- Housing

- Housing instability
  - Affordability
  - Vacant Unit Availability
- Homelessness
- Inadequate Housing
  - Utilities
  - Mold Growth
  - Indoor air quality
  - Crowding

- Food

- Food insecurity
- Access to quality food, i.e food deserts

- Education

- Educational Attainment
- Health literacy

- Transportation

- Reliable Vehicle access
- Public Transportation availability and access
- Walkability




- Financial health

- Poverty
- Debt
- Savings

Source: Accountable Health Communities Health-Related Social Needs Screening Tool (<https://innovation.cms.gov/files/worksheets/ahcm-screeningtool.pdf>)  
Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Retrieved 11.18.2021,  
from <https://health.gov/healthypeople/objectives-and-data/social-determinants->



# Framework & Key Constructs

	<b>Construct</b>	<b>Definition</b>	<b>Operational Level</b>	<b>Considerations</b>
<b>Broad</b>  <b>Focused</b>	 <b>Social Determinants of Health</b>	<i>Conditions in which people are born, grow, live, work, and age</i>	<b>Community</b>	Socio-Cultural & Structural Factors
	 <b>Social Risk Factors</b>	<i>Specific adverse conditions associated with poor health</i>	<b>Individual</b>	Community Context & Personal Circumstance
	 <b>Social Needs</b>	<i>Immediate individual needs</i>	<b>Temporal</b>	Self-Identified & Time-Specific

Source: Socially Determined

# Risk and Protective Factors

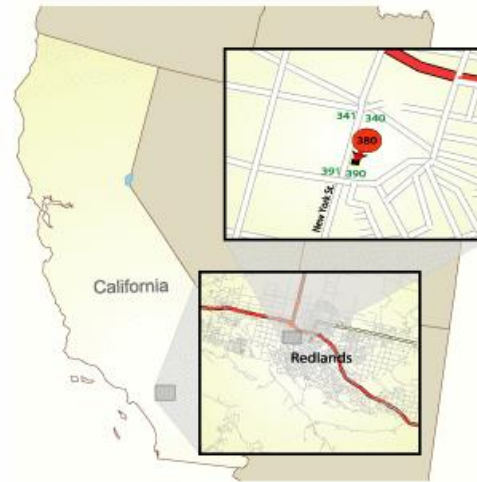
- Risk factors are attributes in individuals, families and communities that increase the likelihood adverse effects on health and well-being.
- Protective factors are attributes in individuals, families and communities that promote health and well-being.
  - Every Individual, family and community has a combination of risk and protective factors.
  - The presence of protective factors may lessen the likelihood that a risk factor will have an adverse effect.

Source: Child Welfare Information Gateway ([childwelfare.gov](http://childwelfare.gov)) & Gravity Project (<https://confluence.hl7.org/display/PC/The+Gravity+Project+Home>)

# Geocoding

# What is Geocoding?

- Transforming a description of a location, like an address or name of a place, to a location on the earth's surface
  - The description is transformed into usable data that include geographic features to use for mapping a geographic and spatial analysis



Source: ArcGIS <https://desktop.arcgis.com/en/arcmap/latest/manage-data/geocoding/what-is-geocoding.htm>

# SDOH Application of Geocoding

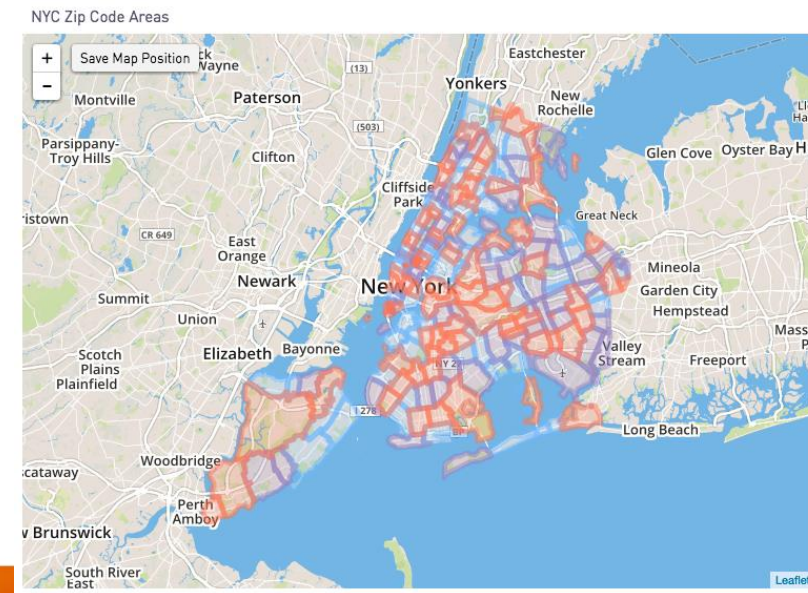
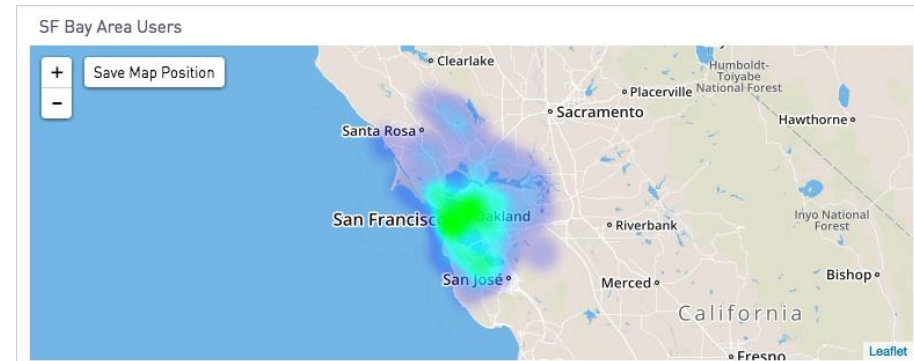
- Locating addresses into Communities and associating that with community level data
  - U.S. Census Bureau
    - Unemployment Rates
    - Educational Attainment Rates
  - USDA
    - Communities with Access to Supermarket
    - Rural Urban Commuting Area Codes
  - Crime data
  - Area Deprivation Index
    - CMS applications
      - 2023 MA Advance Notice mentions testing Area Deprivation Index
      - ACO Reach Health Equity Benchmark Adjustment
- Finding commuting distances and travel times between addresses
  - Transportation barriers to healthcare access

## Showing Differences on Maps



# Heatmaps and Choropleth Maps

- Heatmaps show change of across geography, like density
- Choropleth compare differences across specific geographic units like nations, states, counties, neighborhoods



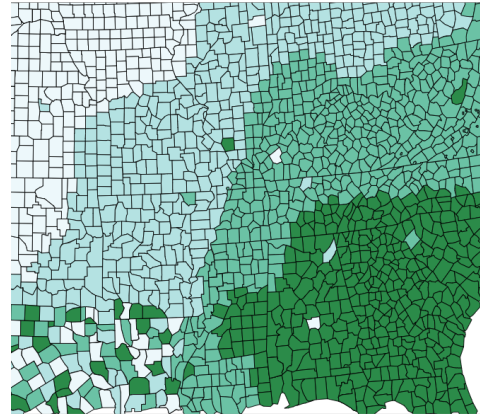
Source: Sisense: <https://dtdocs.sisense.com/article/heatmaps>, <https://dtdocs.sisense.com/article/geoison>

# Choropleth considerations

## Color scales for different purposes

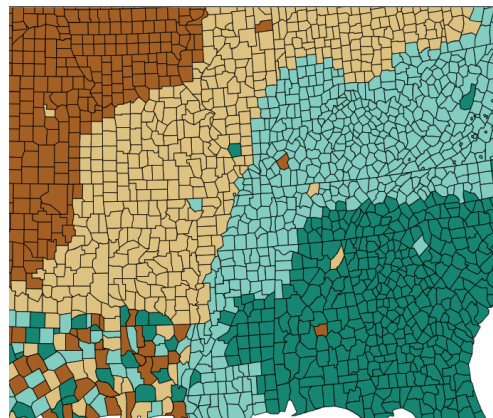
- Sequential

- Shows low-high differences
- light colors represent low values, dark high values



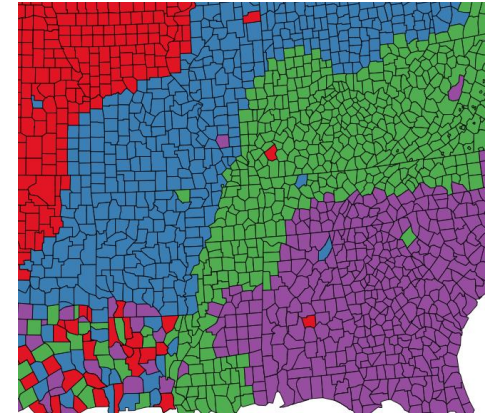
- Diverging

- Shows polarized differences
- Critical class is the middle value representing median
- Darker means more contrast



- Qualitative

- Shows the difference between non-numeric categories
  - Regions
  - most popular sports
  - least popular music.
- Doesn't show magnitude

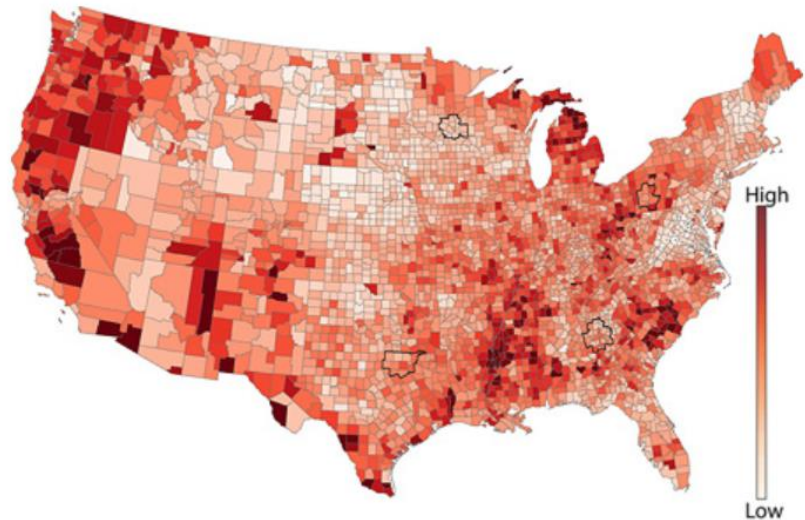


Source: Color brewer <https://colorbrewer2.org/>

# Choropleth scaling methods

## Sequential and divergent

- Continuous
  - Sequential method only



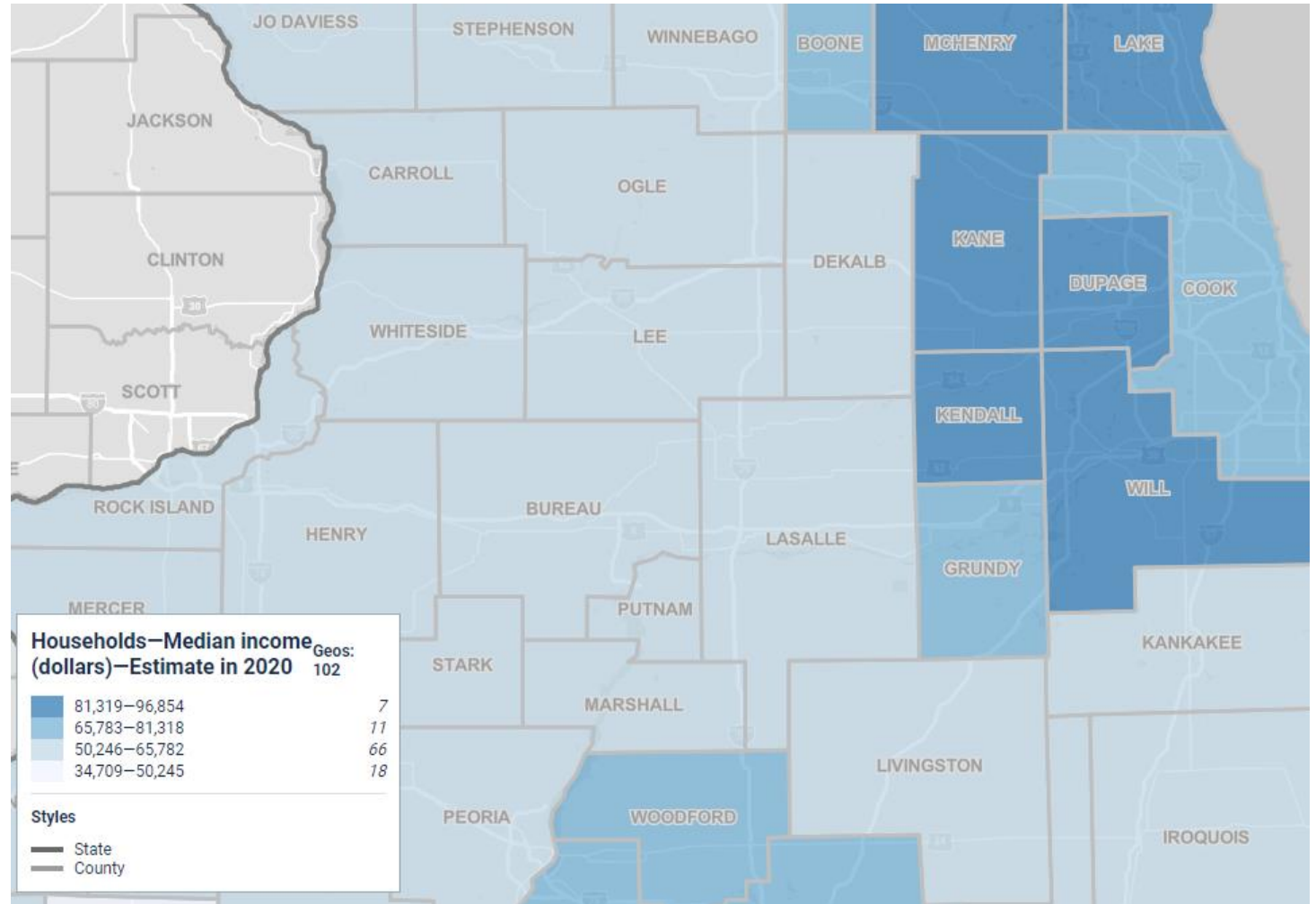
Source: Axismaps <https://www.axismaps.com/guide/choropleth>

- Grouped
  - Manual
  - Equal Interval
  - Quantile
  - Natural breaks



# Equal Interval

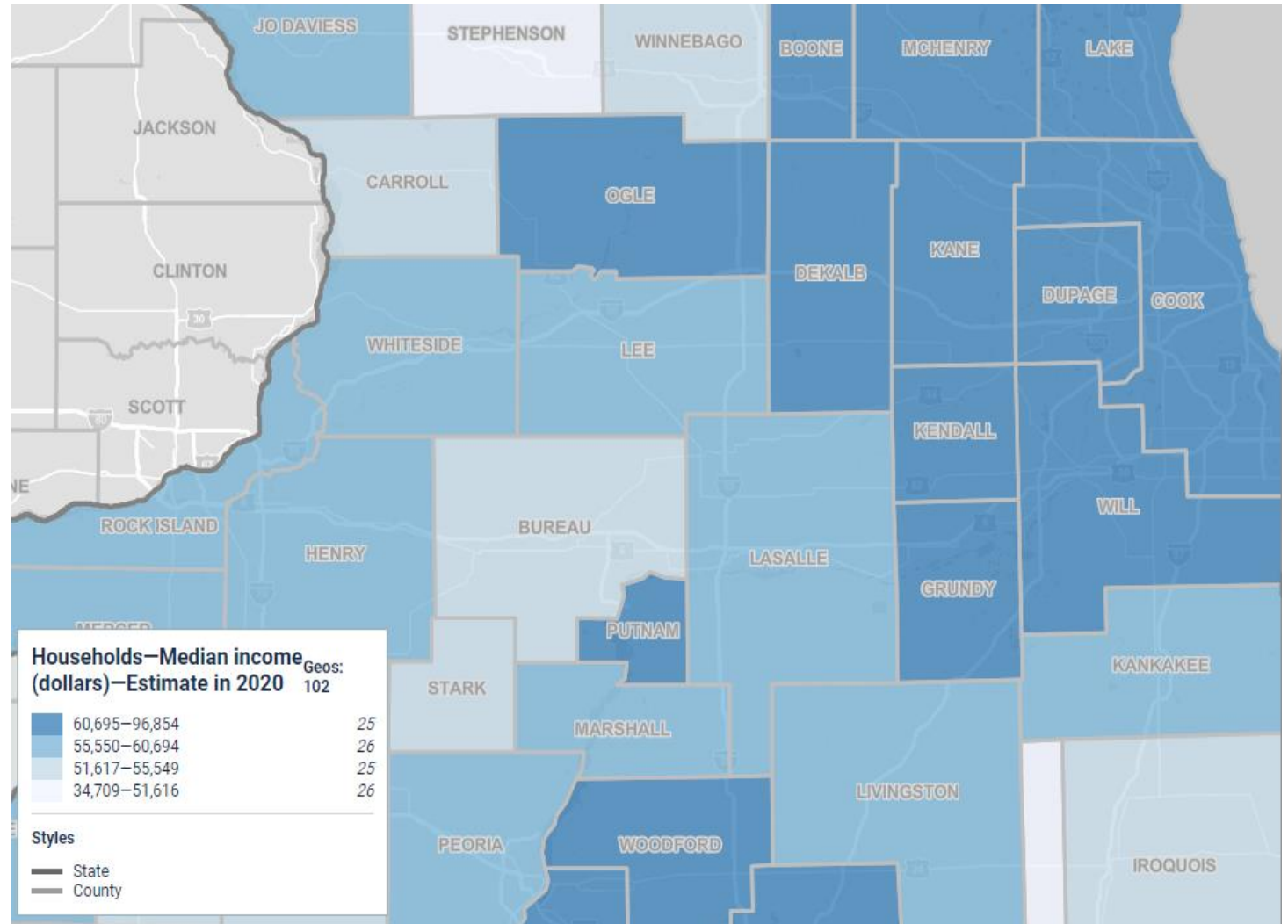
Example with Median Household income



Source: US Census

# Quantile

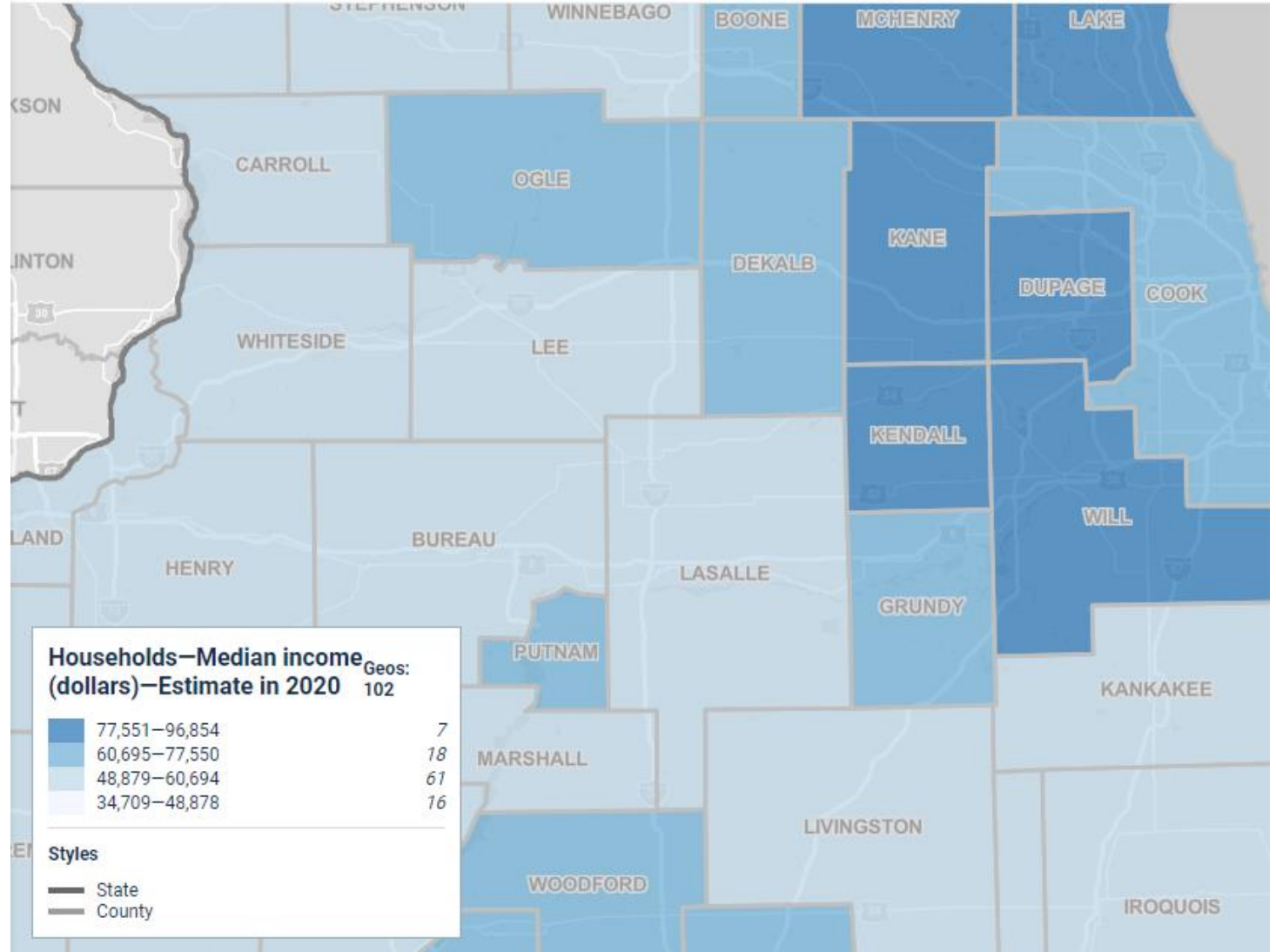
Example 2 Using Median Household Income



Source: US Census

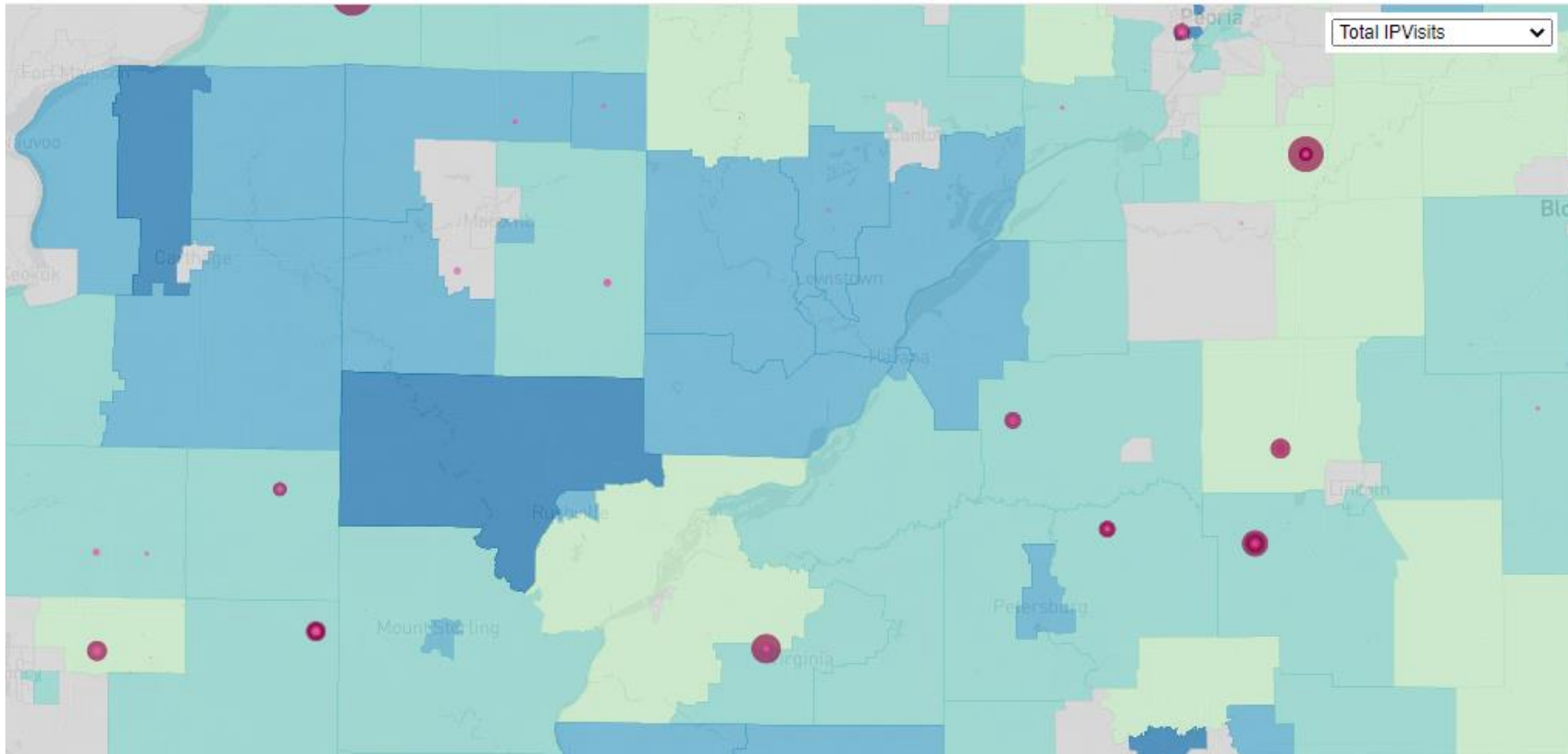
# Natural Breaks

Example 3 Using Median Household Income



Source: US Census

# Choropleth Maps SDOH and Geocoding



Source: Pulse8-Evalu8 using zip codes geocoded as points and US Census tract poverty quantile grouped

# Z-Codes



# SDOH Clinical Activities

- Assessment of Social Risk
  - i.e. Accountable Health Communities Health-Related Social Needs Screening Tool
  - LOINC Codes
- Coding of Health Concern and Problems
  - ICD-10CM, SNOMED CT
- Patient Driven Goals
  - LOINC code
- Interventions
  - CPT/HCPCS, SNOMED CT
- Procedures Document Results
  - CPT/HCPCS, SNOMED CT
- Outcomes (Quality Measures)

Source: Gravity Project [http://hl7.org/fhir/us/sdoh-clinicalcare/STU1/sdoh\\_clinical\\_care\\_scope.html](http://hl7.org/fhir/us/sdoh-clinicalcare/STU1/sdoh_clinical_care_scope.html)

# Z-Codes: SDOH ICD-10-CM

- Once social risks are assessed in a patient encounter, SDOH health concerns and problems can be documented by the provider
- Many of the SDOH health problems and concerns can fit into the following ICD-10-CM Z Code Categories

<b>Z code</b> <b>Categories</b>	<b>Z55</b> - Problems related to education and literacy	<b>Z62</b> - Problems related to upbringing
	<b>Z56</b> - Problems related to employment and unemployment	<b>Z63</b> - Other problems related to primary support group, including family circumstances
	<b>Z57</b> - Occupational exposure to risk factors	<b>Z64</b> - Problems related to certain psychosocial circumstances
	<b>Z59</b> - Problems related to housing and economic circumstances	<b>Z65</b> - Problems related to other psychosocial circumstances
	<b>Z60</b> - Problems related to social environment	
	<b>This list is subject to revisions and additions to improve alignment with SDOH data elements.</b>	

Source CMS

# FY 2022: SDOH Z Code changes

## **Education and literacy Changes**

- Z55.5 Less than a high school diploma

## **New Z Code Category**

- Z58 Problems related to physical environment
  - 12 diagnoses within this new Group

## **Food and drinking water changes**

- Z59.4 was revised from “Lack of adequate food and safe drinking water” to
  - Z58.6 Inadequate drinking-water supply
  - Z59.4 “Lack of adequate food”
- Z59.41 Food insecurity
- Z59.48 Other specific lack of adequate food

# FY 2022

## SDOH Z Code changes (Cont.)

### **Homelessness and Housing instability changes**

- Z59.00 Homelessness unspecified
- Z59.01 Sheltered homelessness
- Z59.02 Unsheltered homelessness
- Z59.81 Housing instability, housed
- Z59.811 Housing instability, housed with risk of homelessness
- Z59.812 Housing instability, housed, homelessness in past 12 months
- Z59.819 Housing instability, housed unspecified
- Z59.89 Other problems related to housing and economic circumstances

Questions?

THANK YOU



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