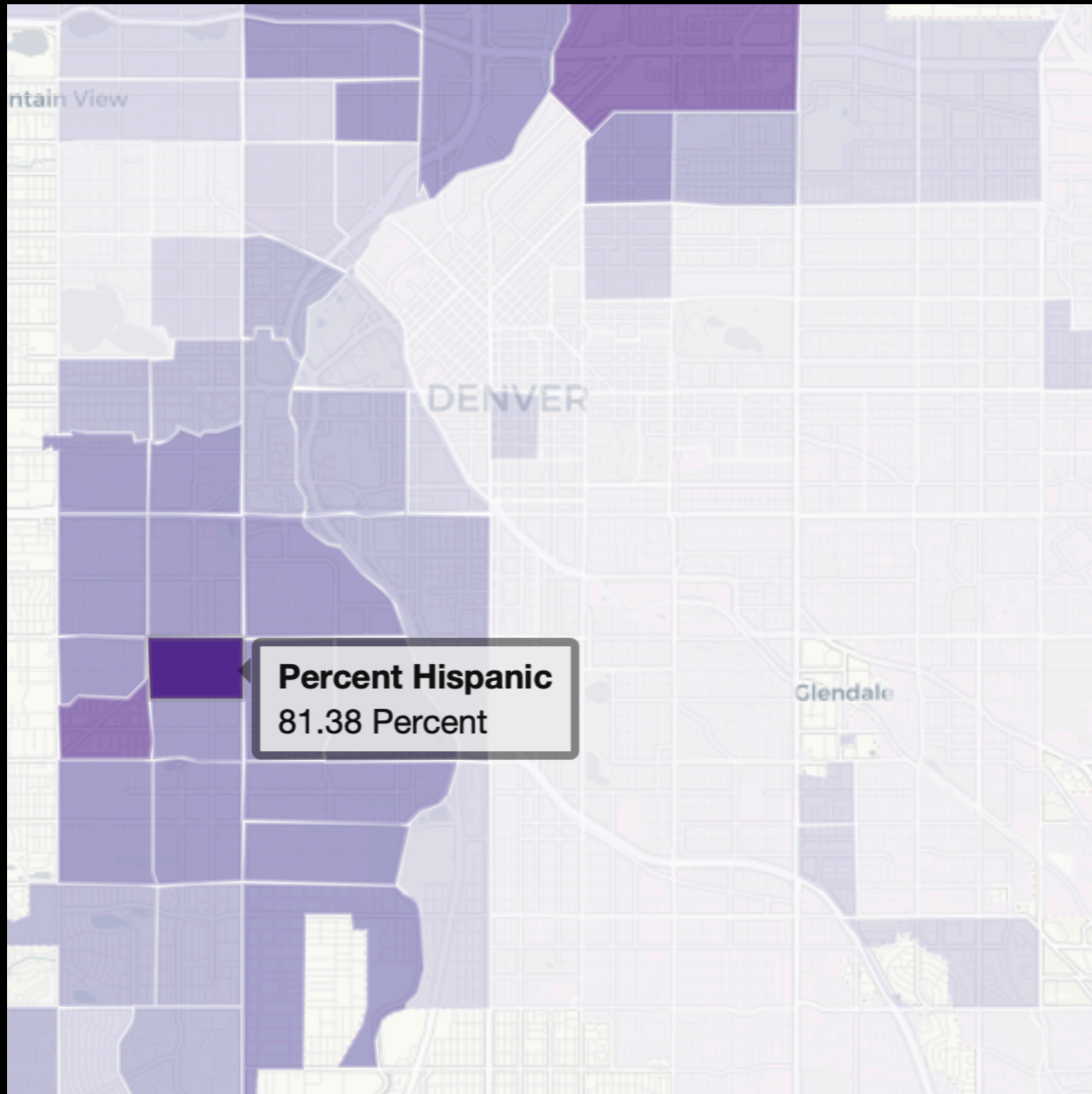# Better Boundaries

Why spatial enumeration units matter

Molly Graber

What does demographic data look like?

Why aggregate spatially?

Aggregation gives us denominators. We can compare rates of some outcome over different spatial areas.

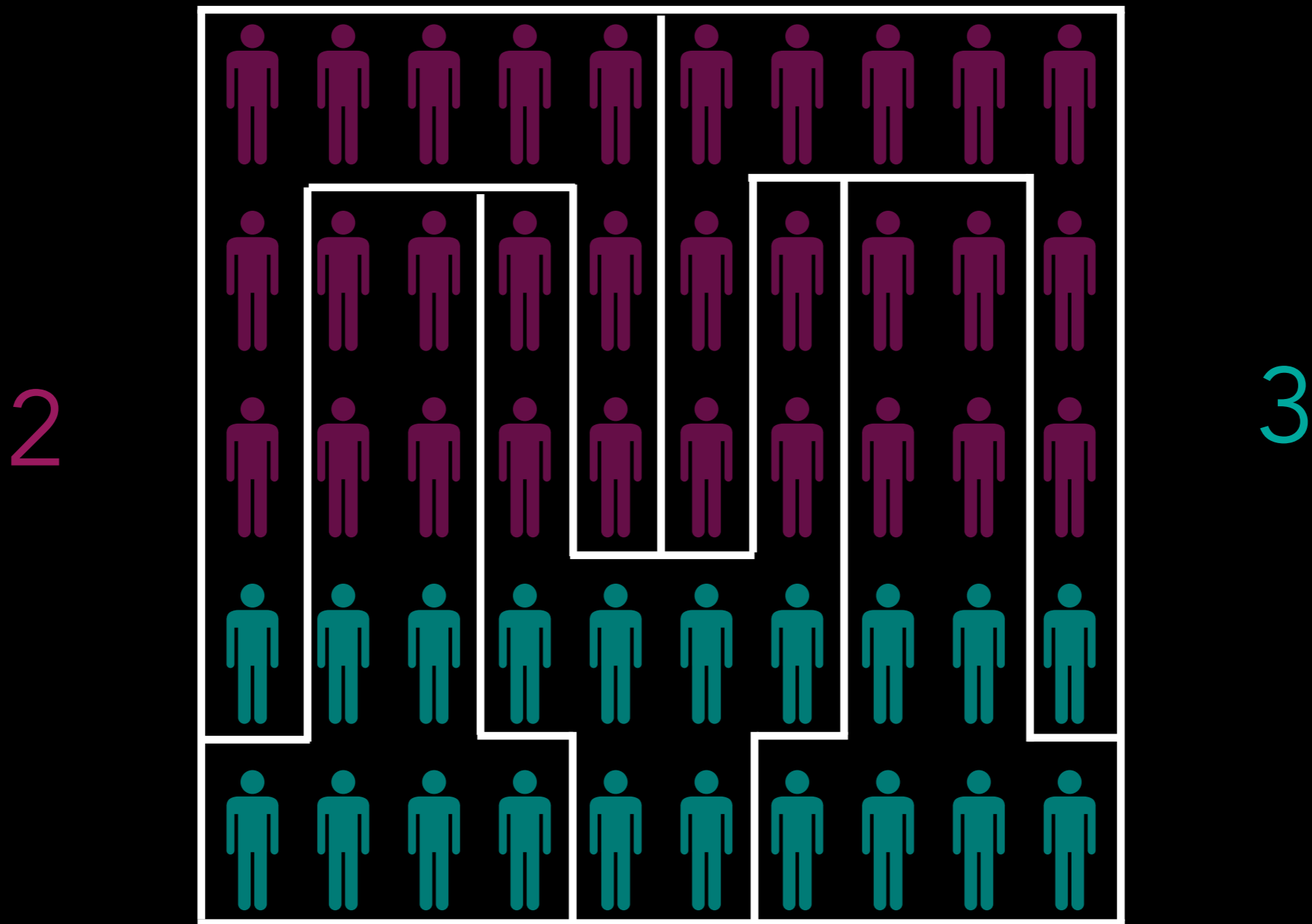Aggregation defines social contexts for other research.

Aggregation protects privacy.

Aggregation allows us to comprehend otherwise massive sets of data.

There is no neutral spatial aggregation.

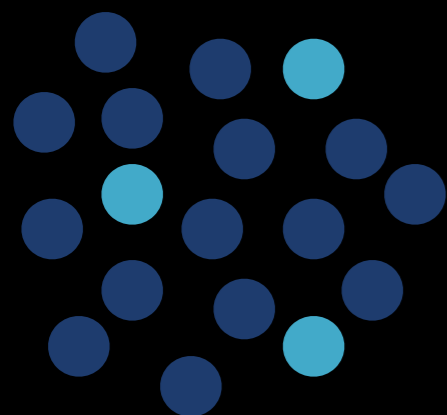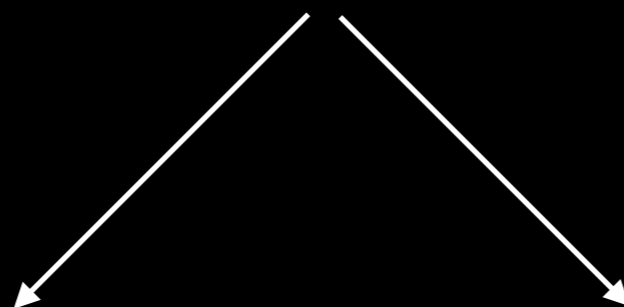There is no neutral spatial aggregation.
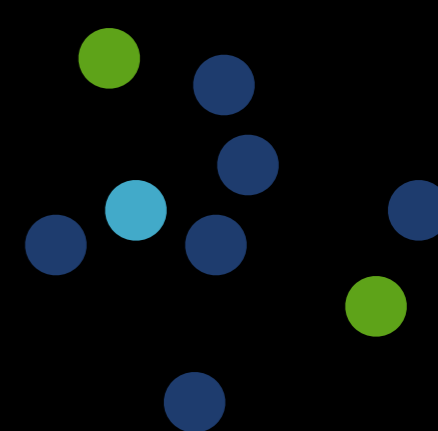
Boundaries matter

If enumeration regions (blocks, tracts) are used as a proxy for actual "neighborhoods" — places in which one's lived experience and context is different than in others — it makes sense to draw these boundaries around the most demographically similar areas as possible.

This also has implications for data quality of survey statistics. Better boundaries might make for less uncertainty.
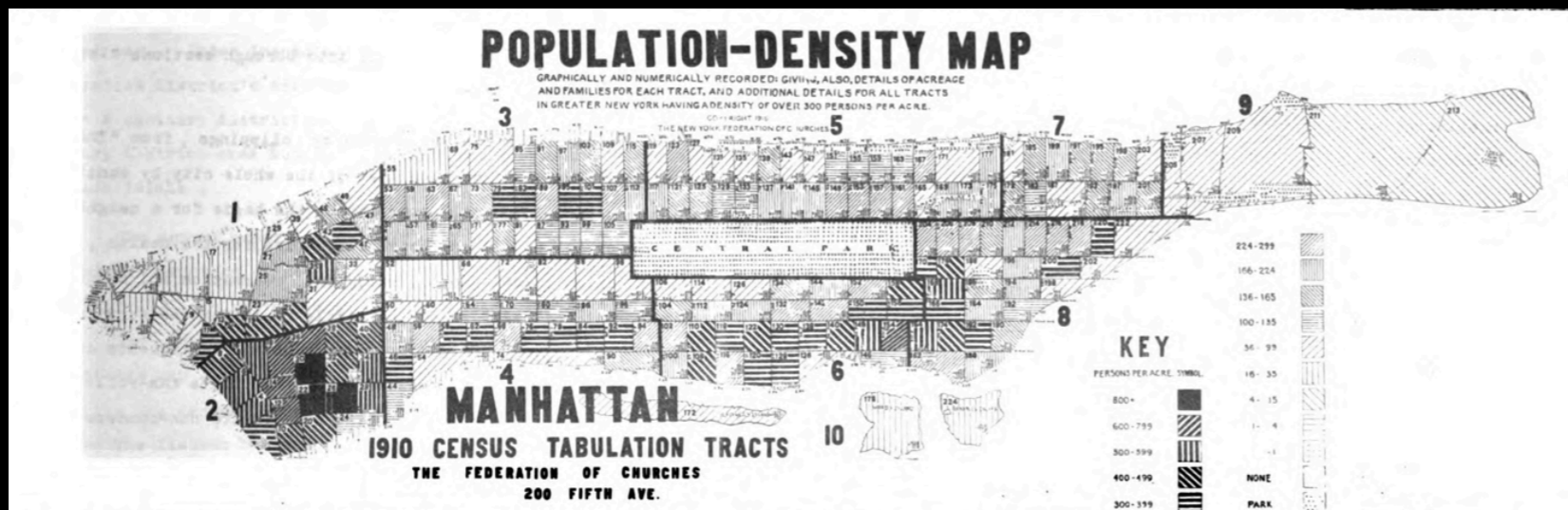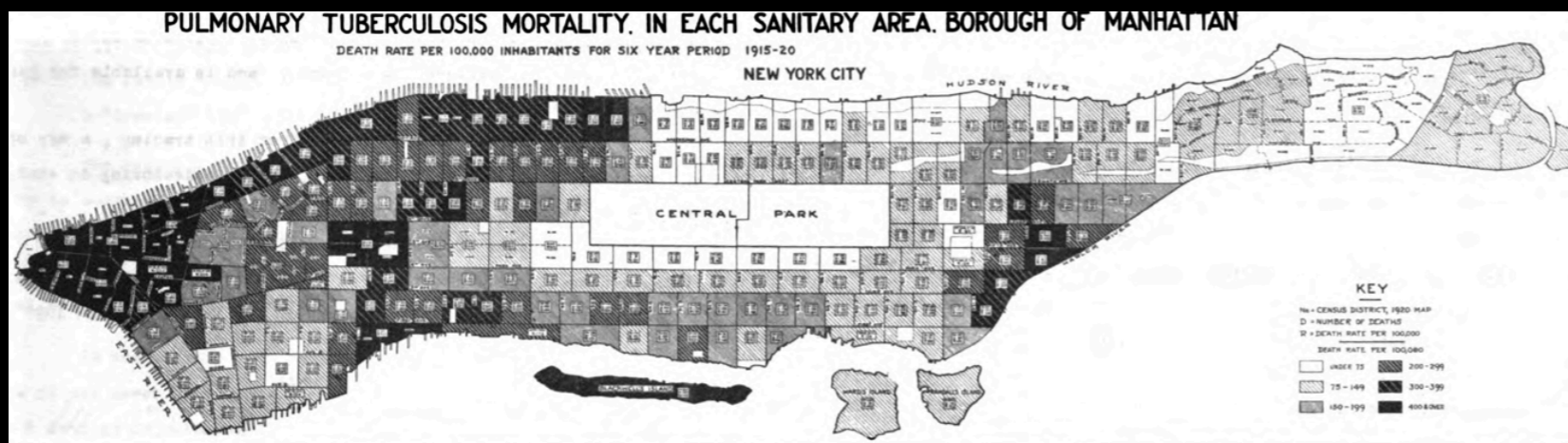
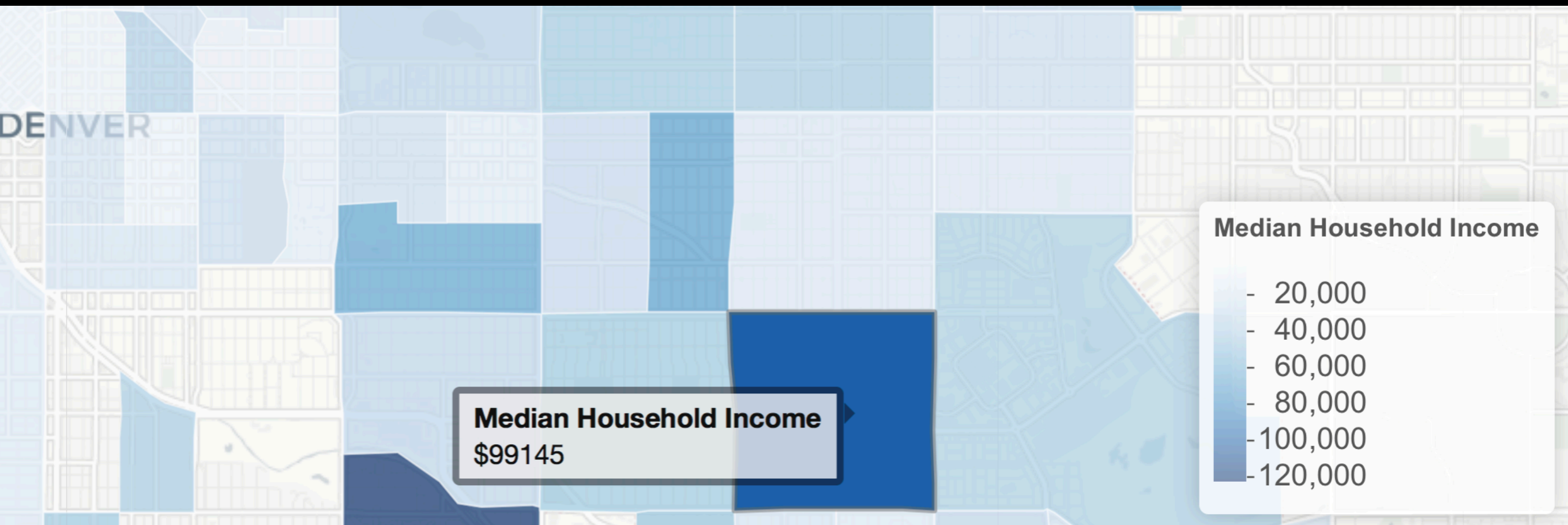ESTIMATE UNCERTAINTY

Homogeneity

Sample Size

The current system

PULMONARY TUBERCULOSIS MORTALITY. IN EACH SANITARY AREA. BOROUGH OF MANHATTAN
DEATH RATE PER 100,000 INHABITANTS FOR SIX YEAR PERIOD 1915-20
NEW YORK CITY

POPULATION-DENSITY MAP
MANHATTAN
1910 CENSUS TABULATION TRACTS
THE FEDERATION OF CHURCHES
200 FIFTH AVE.

"Census tracts are small, **relatively permanent** geographic entities within counties (or the statistical equivalents of counties) delineated by a committee of local data users. Generally, census tracts have between 2,500 and 8,000 residents and boundaries that follow visible features. **When first established**, census tracts are to be as homogeneous as possible with respect to population characteristics, economic status, and living conditions."
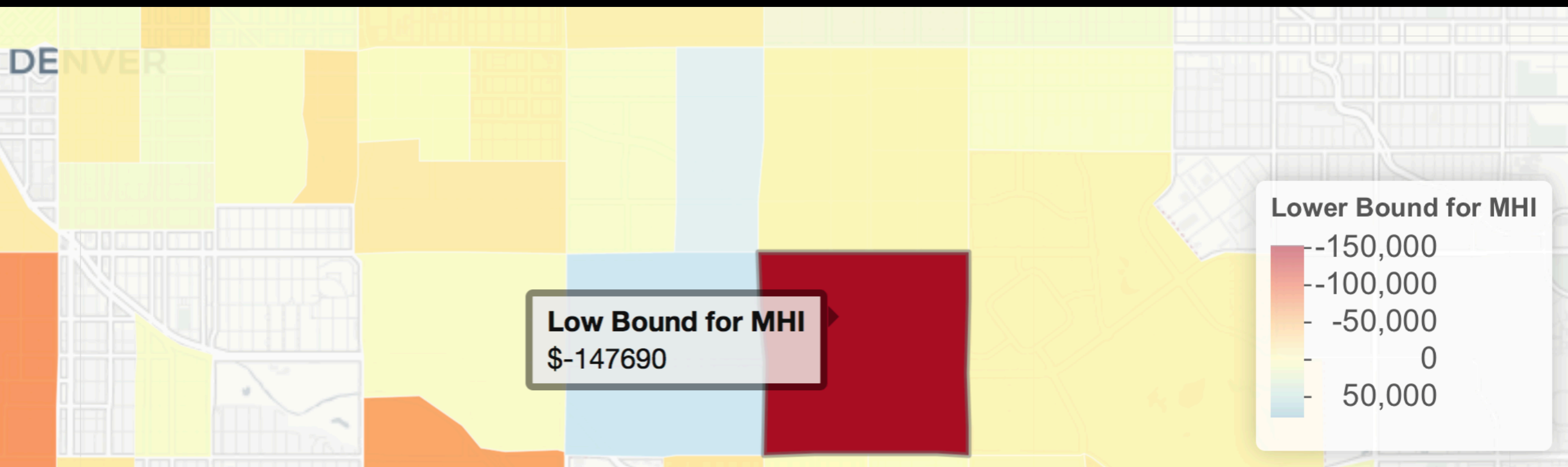
–Geographic Areas Reference Manual, Bureau of the Census

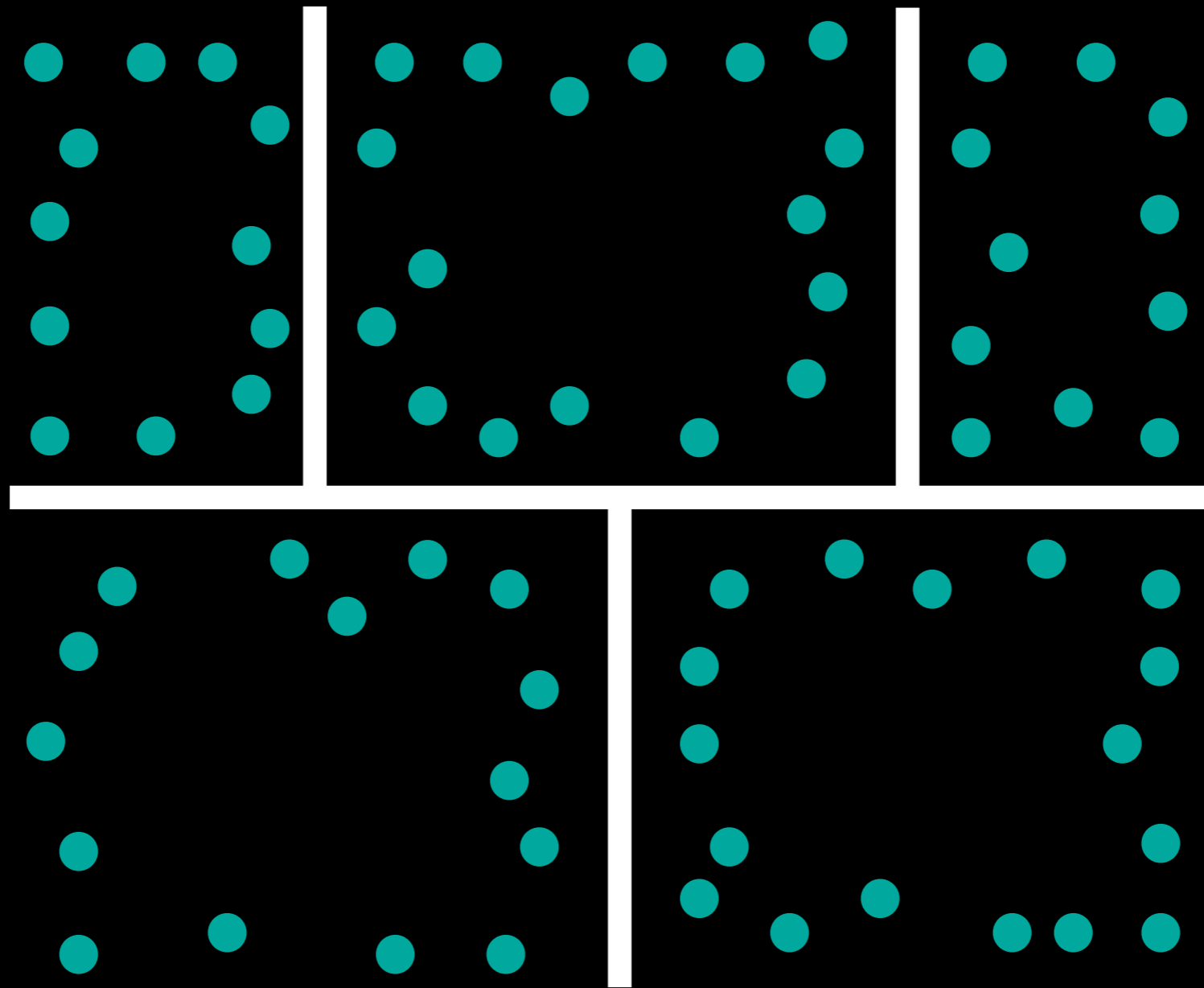"Census tract 43.06 is the wealthiest in the group"

Median household income for black householders, 2015

"Census tract 43.06 is the *poorest* in the group?"

Estimate minus the margin of error (lower bound of a confidence interval).
All orange-to-red colors indicate tracts where the uncertainty is larger than the estimate.

RDC microdata

What patterns would emerge if we had a map of all households in the nation?

Better boundaries

- *Egocentric neighborhoods:* how does context change with scale?

- *Randomized geographic boundaries:* how much do measures of context vary if we change the shape and size of enumeration units

- *Street-based geographies:* What happens if we treat streets as meaningful units of social space, rather than boundaries?

Better boundaries

- *Egocentric neighborhoods:* how does context change with scale?

- *Randomized geographic boundaries:* how much do measures of context vary if we change the shape and size of enumeration units

- *Street-based geographies:* What happens if we treat streets as meaningful units of social space, rather than boundaries?

What do streets mean to you?

Kenny Be, 1985

Context & Interactions

Remember our motivation: understanding context

Social context partly stems from interactions between people. Streets are frequently the centers of interaction, not the boundaries of it.

Streets have their own vibrancy and character (or lack of it) that influence how a region feels, and how it affects its inhabitants.
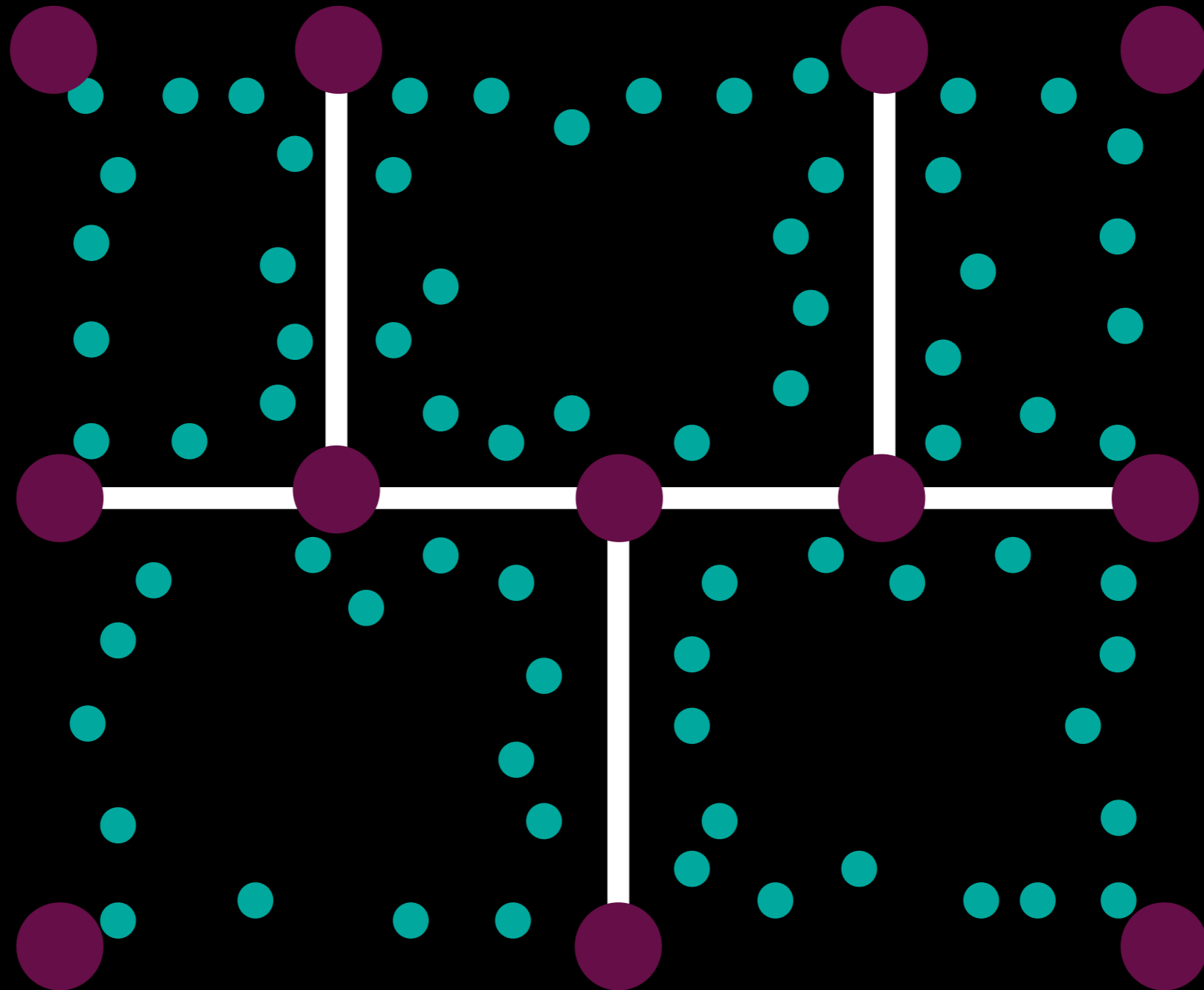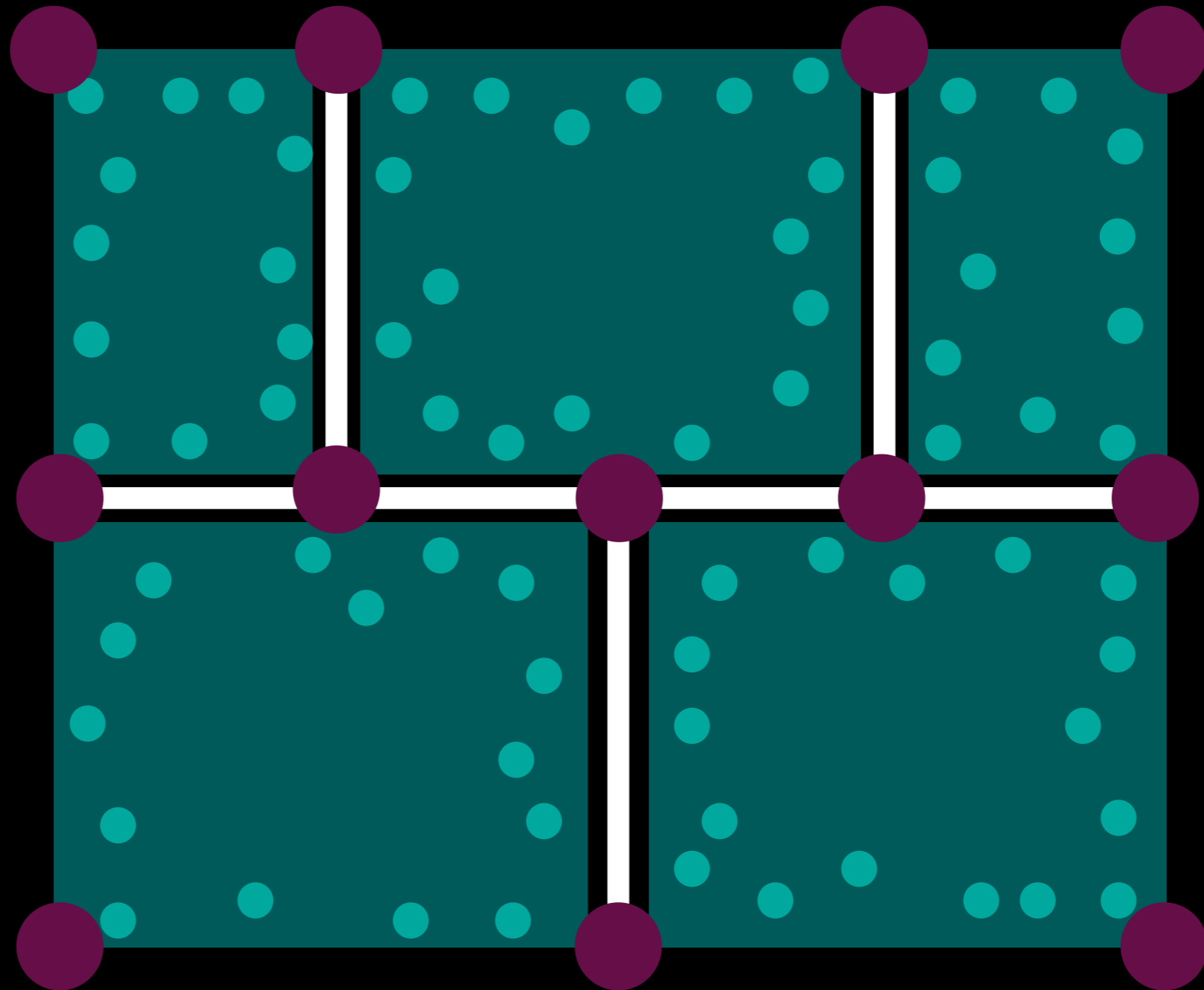
Westword, 2012

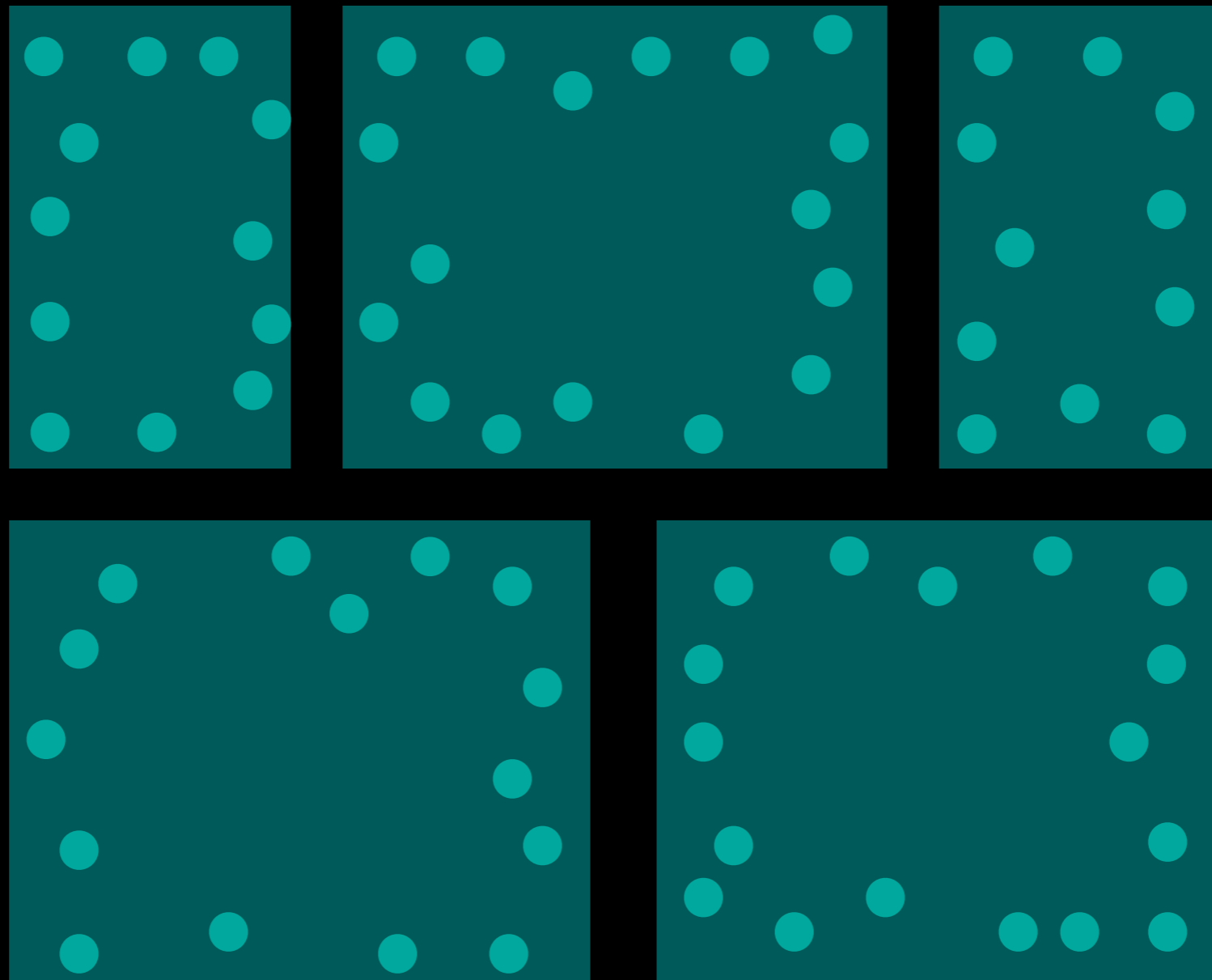What they mean to the US Census Bureau
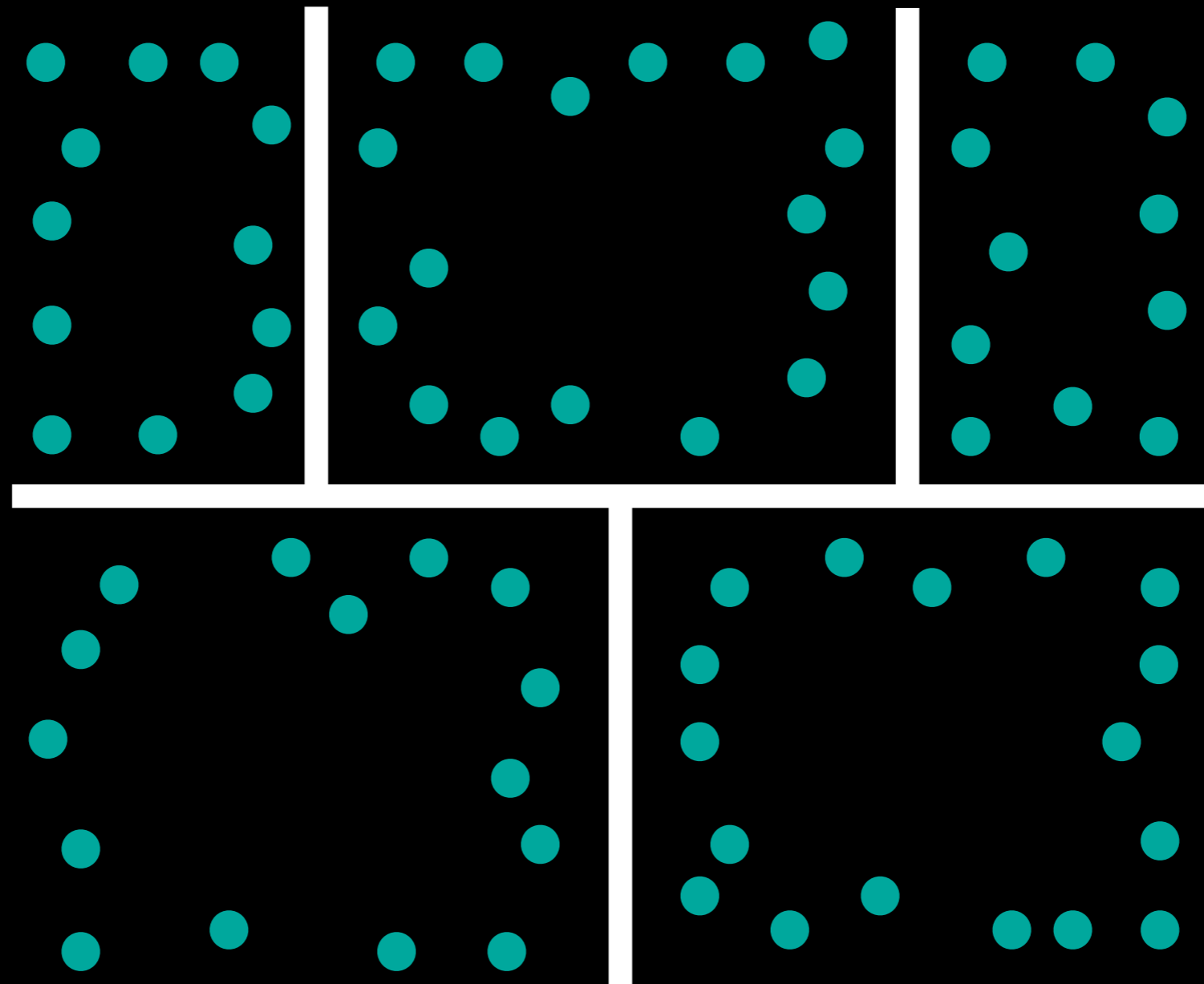
What they mean to the US Census Bureau

What they mean to the US Census Bureau

What they mean to the US Census Bureau

In the next 8 months, I aim to explore street-based regionalizations.

How do estimates derived from data aggregated at the street-level vary from those the USCB provides at the block-level? Are there additional spatial patterns within blocks that current aggregation is failing to capture?

Street segments are small, and are not a sufficiently large enumeration unit for publicly available estimates or for sparser ACS responses. How might segments be combined into contiguous "regions" with the greatest demographic homogeneity?

What shapes of network-based regions make sense? Do sufficiently large streets act as boundaries? How might this be built into a cluster-finding criteria?