Social Determinants of Health In Western New York

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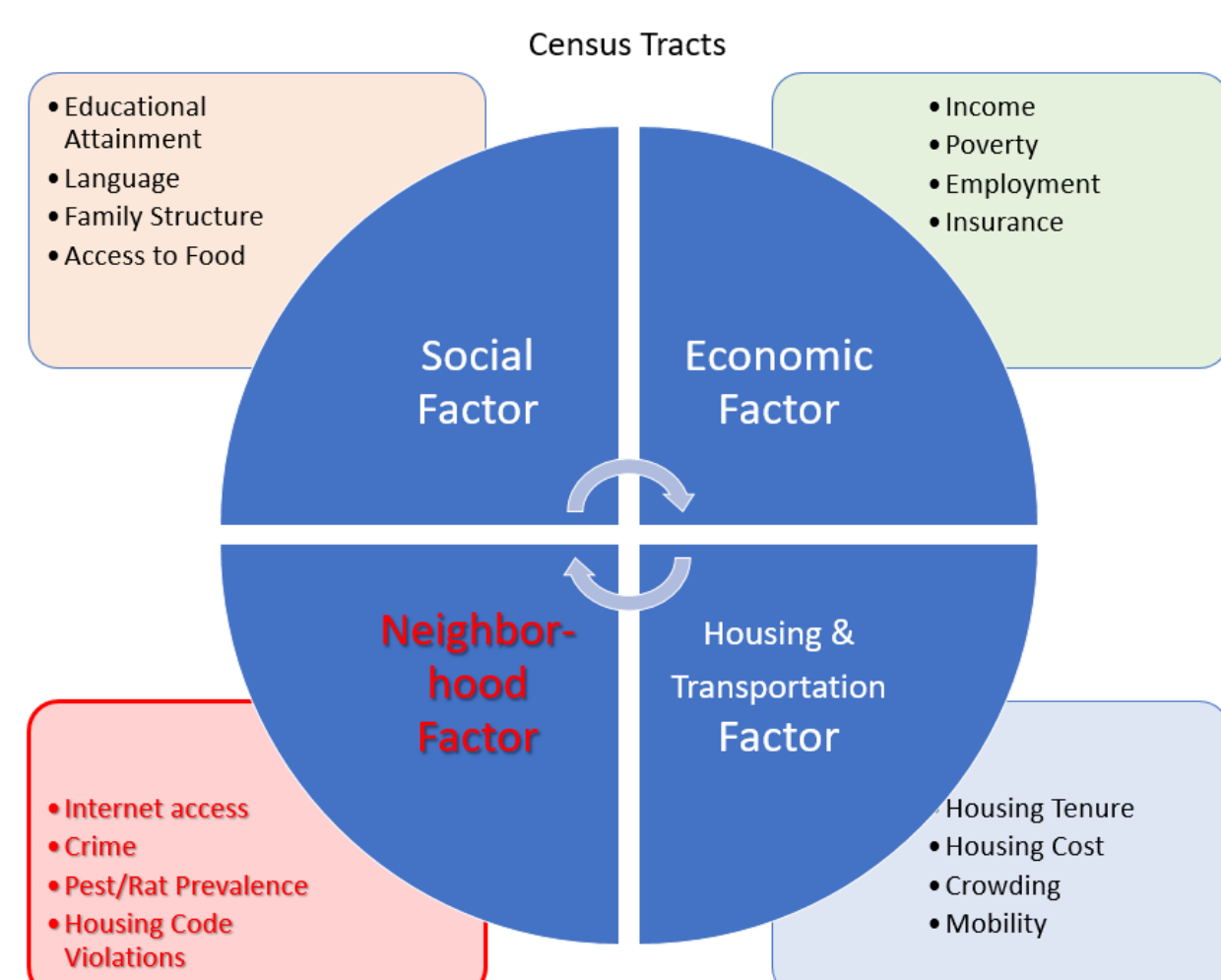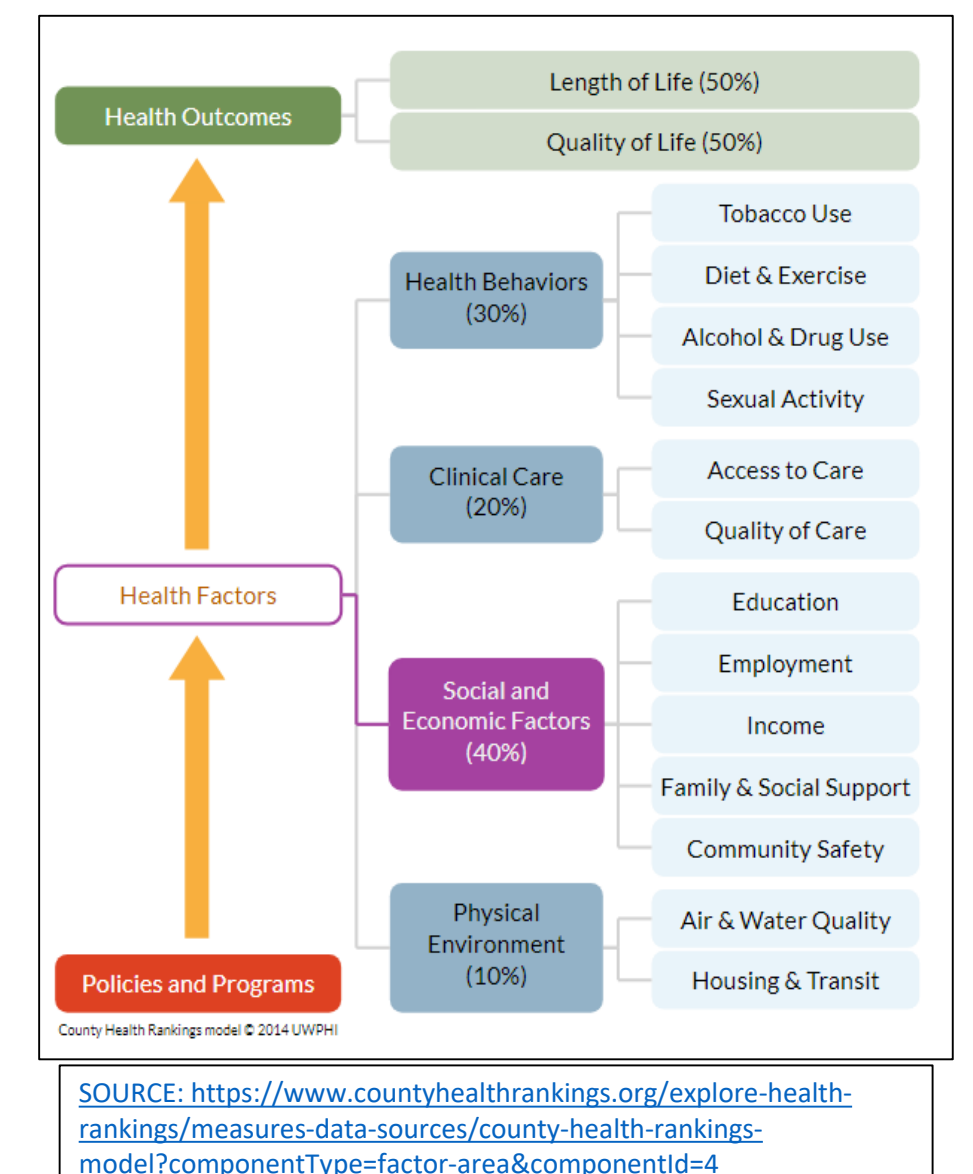Associate Professor, SUNY Buffalo State
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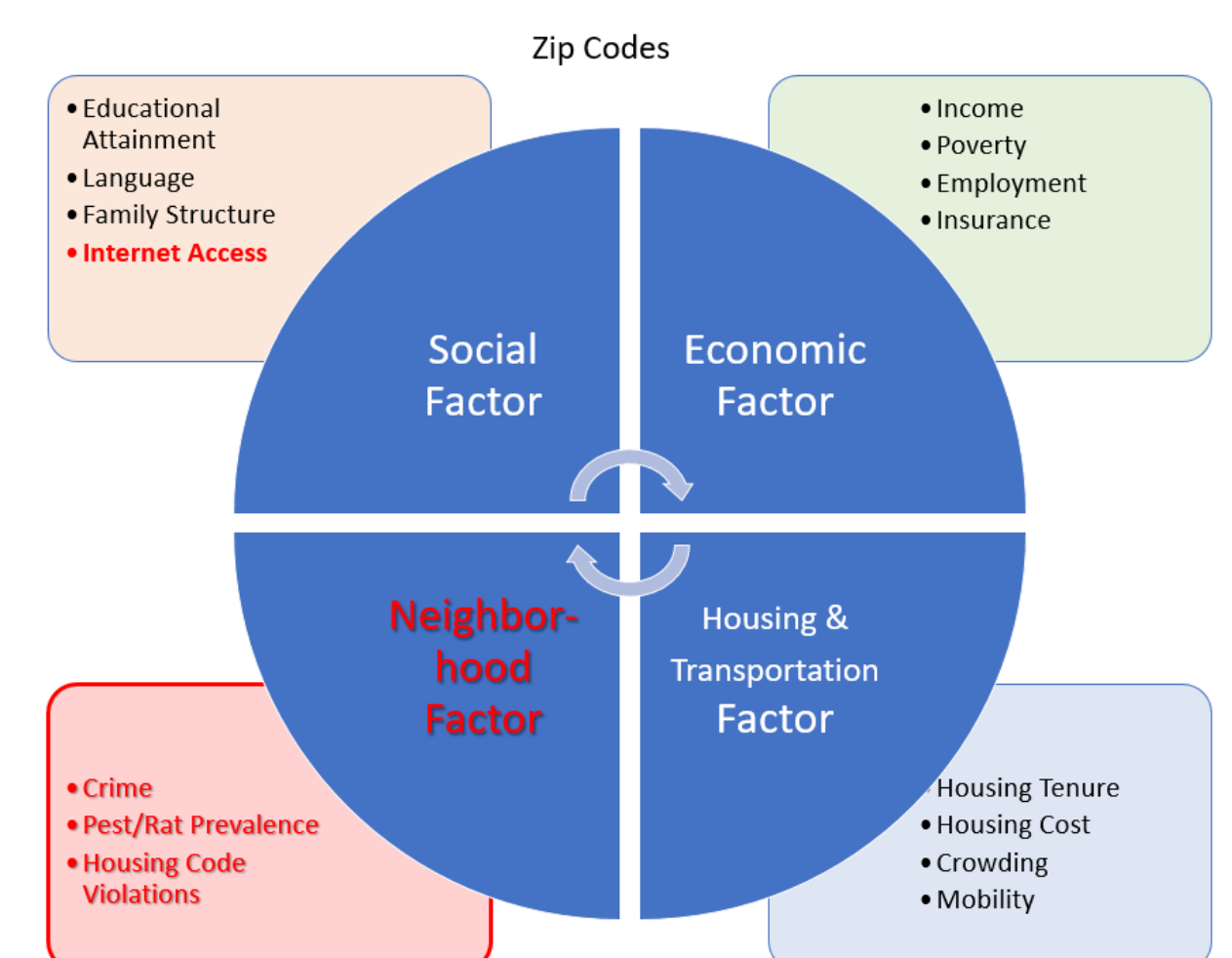Advisory Board SUNY Buffalo PSM, PACM, MSDSA

Background

- Social and economic characteristics play a significant role in health outcomes of individuals.
- Maps are a useful way of visualizing areas at high risk regarding *social determinants of health*. These are the first mapping applications to show these previously unseen healthcare barriers in WNY. They were created for community health professionals to use to visualize what areas may be experiencing greater SDOH barriers, so they may help accordingly.
- A web-based **story map** was modeled after the work done by the North Carolina Institute of Public Health. The story map was circulated through the Western NY health care community.
- Feedback sparked creation of an **interactive web mapping application** using different geography. Zip code level data can better aid community health care workers to understand the SDOH needs of the populations they serve.
- Both applications use data from the Census Bureau's 2017 American Community Survey, 5 yr. estimates and the City of Buffalo Open data portal. The story map application includes data on food access from the Dept. of Agriculture, Economic Research Services, Food security atlas.
- The story map contains information on 7 counties by census tract. The interactive web mapping application has information on 8 counties by zip code tabulation area.
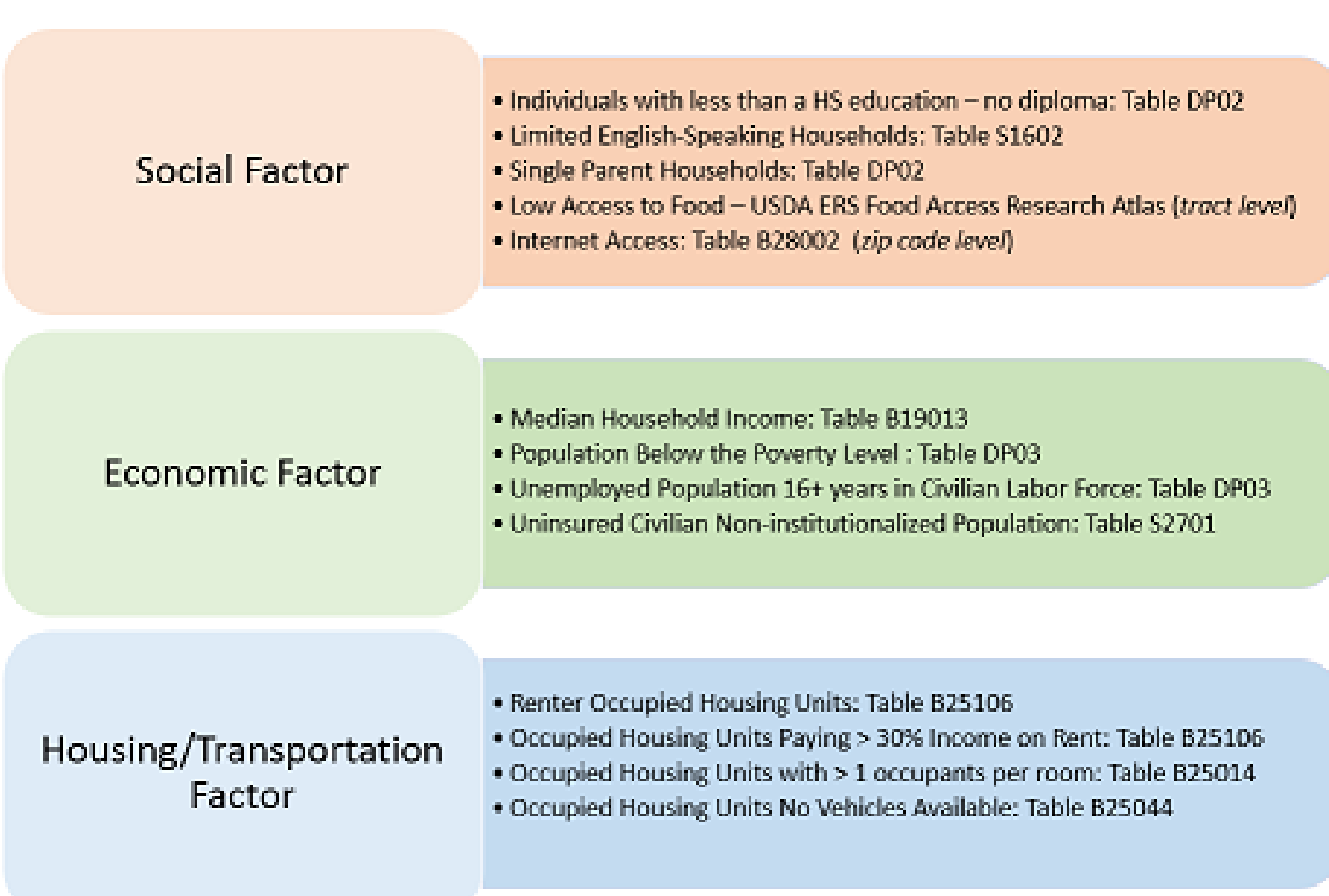

SOURCE: https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model?componentType=factor-area&componentId=4

The Models

Census Tracts

The Social Determinants of Health (SDoH) Index is calculated using three factors. The model for Census tract geography mimics the North Carolina study regarding the Social, Economic, and Housing/Transportation Factors. For zip codes, access to food in the Social Factor is replaced with Internet access.
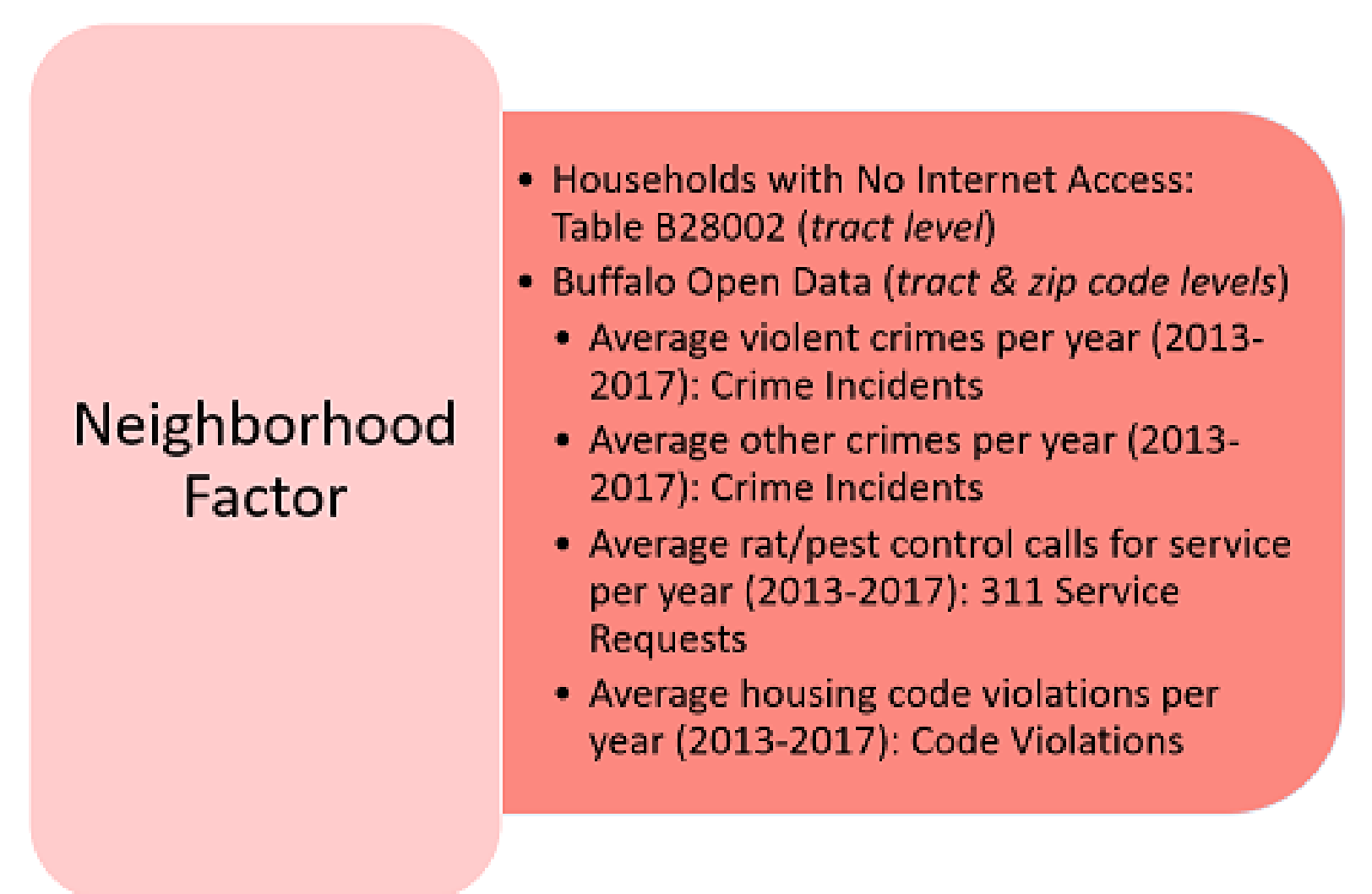

Zip Codes

Both applications incorporate a 4th factor with other characteristics of a neighborhood that may cause stress to individuals. Additionally, data in the Neighborhood Factor demonstrates a benefit of **open** data sets developed by local governments.

Social Factor
- Individuals with less than a HS education – no diploma: Table DP02
- Limited English-Speaking Households: Table S1602
- Single Parent Households: Table DP02
- Low Access to Food – USDA ERS Food Access Research Atlas (*tract level*)
- Internet Access: Table B28002 (*zip code level*)

Economic Factor
- Median Household Income: Table B19013
- Population Below the Poverty Level : Table DP03
- Unemployed Population 16+ years in Civilian Labor Force: Table DP03
- Uninsured Civilian Non-institutionalized Population: Table S2701

Housing/Transportation Factor
- Renter Occupied Housing Units: Table B25106
- Occupied Housing Units Paying > 30% Income on Rent: Table B25106
- Occupied Housing Units with > 1 occupants per room: Table B25014
- Occupied Housing Units No Vehicles Available: Table B25044

Other differences between these applications and the NC story map are:

1. Geographies are removed if 50% or more of the population is in Group Quarters or total population is less than 1,500.
2. The SDoH index is

Neighborhood Factor
- Households with No Internet Access: Table B28002 (*tract level*)
- Buffalo Open Data (*tract & zip code levels*)
  - Average violent crimes per year (2013-2017): Crime Incidents
  - Average other crimes per year (2013-2017): Crime Incidents
  - Average rat/pest control calls for service per year (2013-2017): 311 Service Requests
  - Average housing code violations per year (2013-2017): Code Violations

is calculated considering the MOE of the estimates. The basic math is:

3. Finally, a 90th percentile flag indicating that the tract/zip code value is equal to or greater than 90% of the other tract/zip code values, has been added following the approach used in the **CDC's Social Vulnerability Model (SVM)**

The final SDoH index for a tract/zip code equally weights the contributions of the Social, Economic, and Housing/Transportation Factors.

MEAN
$$\mu_{vE} = \frac{1}{n}\sum_i E_i \qquad \mu_{vM} = \frac{1.645}{n}\sqrt{\sum_i SE_i^2} \ \ where \ SE_i = \frac{MOE_i}{1.645}$$

STANDARD DEVIATION
$$\sigma_{vE} = \sqrt{\frac{\sum_i (E_i - \mu_{vE})^2}{n}}$$

NORMALIZATION
$$IF \ Z_i = \left| \frac{E_i - \mu_{vE}}{\sqrt{SE_i^2 + \frac{\mu_{vM}^2}{1.645}}} \right| > 1.645 \ then \ N_{Ei} = \frac{E_i - \mu_{vE}}{\sigma_{vE}}$$
$$ELSE \ \ N_{Ei} = 0$$

95th Percentile
$$IF \ N_{Ei} = \ > 1.645$$

YOU TRY: Find out what SDOH are impacting your neighborhood! Visit
https://tinyurl.com/y5ghhr7s
Click the Magnifying glass icon in the top right corner, type in your Zip Code, and click enter! Share this map with friends and tag it #BuffaloSDOH