MSKTC
SCI · TBI · BURN
Model Systems Knowledge Translation Center

Effective Use of Geographic Maps

Purpose	This tool provides guidelines and tips on how to effectively use geographic maps to communicate research findings.
Format	This tool provides guidance on geographic maps and their purposes, and shows examples of preferred practices and practical tips for geographic maps.
Audience	This tool is designed primarily for researchers from the Model Systems that are funded by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR). The tool can be adapted by other NIDILRR-funded grantees and the general public.

The contents of this tool were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90DP0012-01-00). The contents of this fact sheet do not necessarily represent the policy of Department of Health and Human Services, and you should not assume endorsement by the Federal Government.

Geographic Data

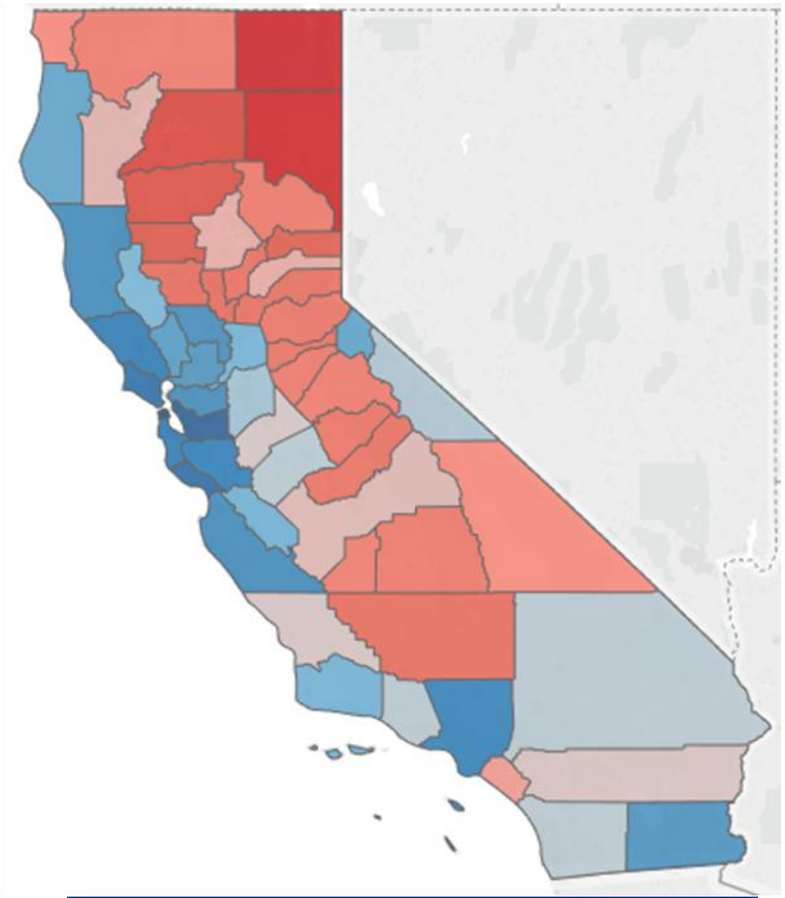
- Geographic data is interesting and easily-mapped with data visualization software.
- Geographic maps can reveal important (sometimes hidden) spatial patterns of events or occurrences (such as an unexpectedly high prevalence of birth defects in certain geographic clusters).
- However, mapped data can often be misleading, especially when the underlying square miles of surface area (such as a county) to be color-coded does not correspond to the number of persons living in such counties (or the number of events occurring in such an area).
- Just because a data set has geographic elements does not necessarily mean that displaying your data in a map format will be informative or perceptually accurate. Use professional judgment.

Obama vs Romney – CA - 2012

Shaded by Who Won the County

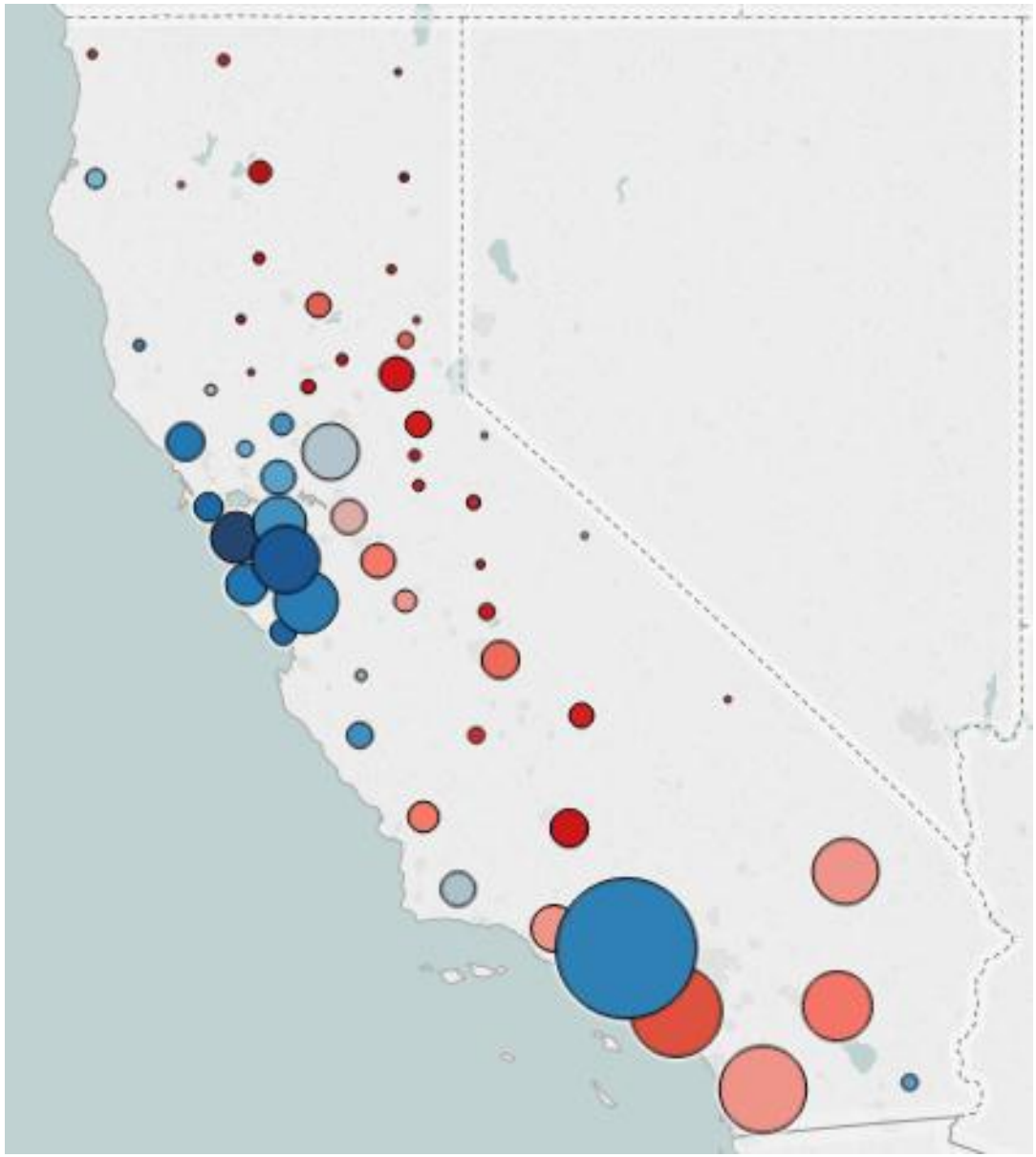
Obama and Romney each won exactly half the CA counties. But Obama won 59% of the total vote in CA.

Shaded by Percent of the Vote in Each County



Now can see additional detail, but still does not illustrate how the overall 59% win for Obama occurred.

Obama vs Romney – CA - 2012



Circles overlying each CA county are color-coded by the relative intensity of votes for Obama vs Romney (percent voting for either Obama or Romney).

But, crucially, the size of the circle is proportional to the total votes cast in the county.

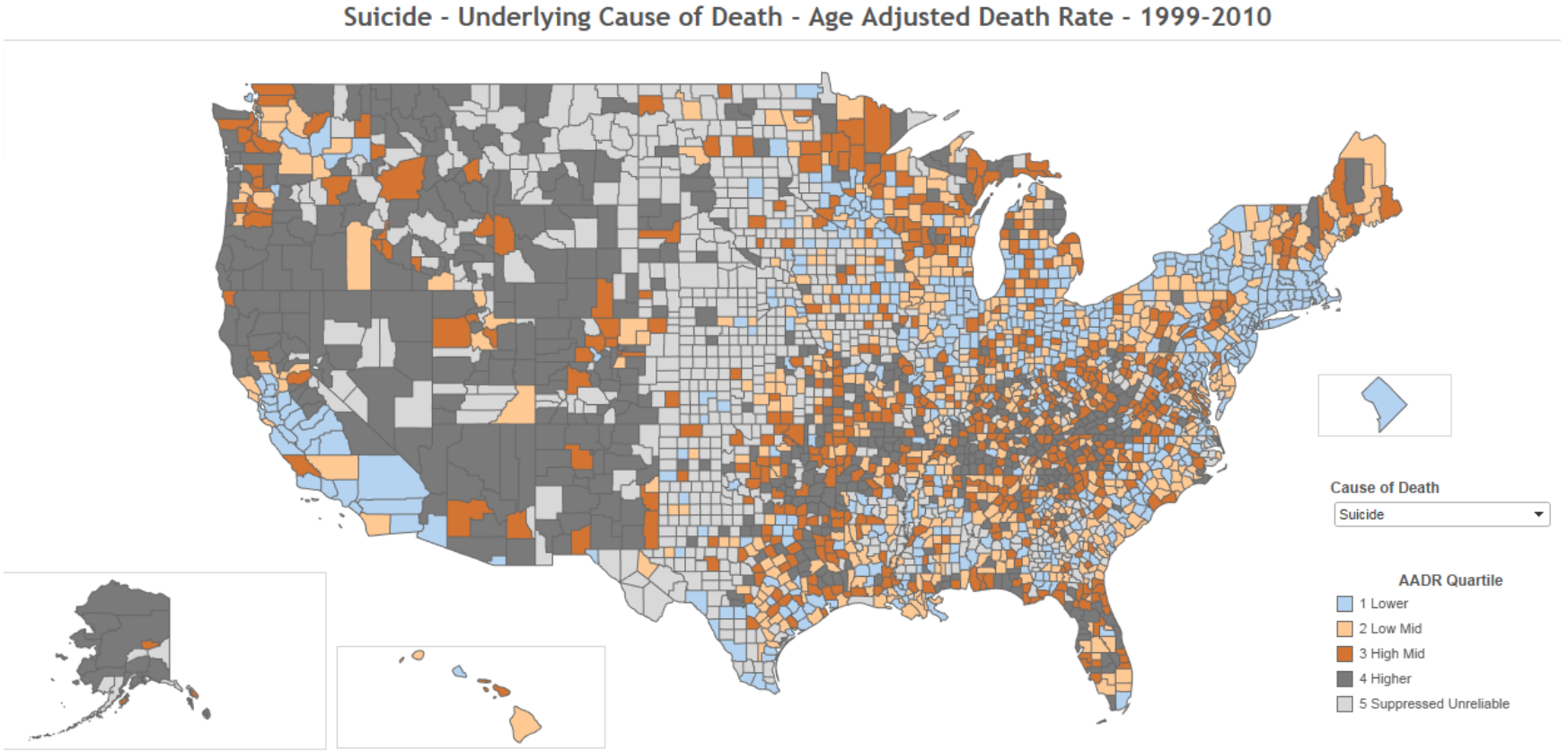
As such, can see that Obama won substantially in the Los Angeles and San Francisco high-population areas.

Romney won many of the smaller population counties (with the exception of San Diego, Orange, Riverside)

Geographic Data

- The frequent disconnect between the geographic area and the population residing therein is often called the “Montana effect” in which a large geographic area might be home to a relatively small population – or conversely the “New York City” effect in which a very large population resides in a very small geographic area.
- In either scenario, color-coded nation-wide maps, for example, could easily be misinterpreted.
- Human perception is drawn to larger areas on a map. As such, viewers almost always notice the color-coding on some of the large geographic counties in AZ and other Western states and often cannot distinguish differences in color-coding the in densely populated Northeast corridor.

Geographic Data

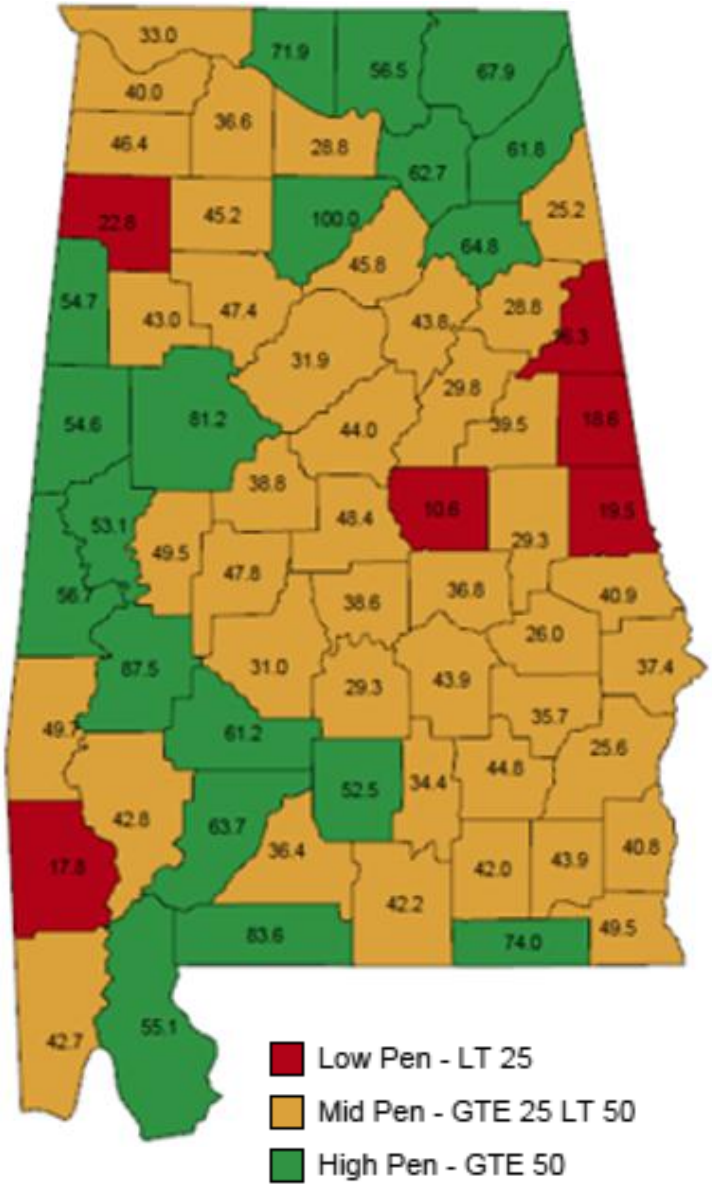


Note the large Western county effect and the condensed urban corridor effect. Always include a color code for missing or unreliable or unstable data so that a blank county, to use this example, would not be interpreted as having zero suicides.

Also decide how and where to place and size AK HI DC PR VI etc.

Source: CDC

Performance Coding by Geography



Can use map-based approaches to display performance results by geography.

In this example, each county service agency had an annual minimum expectation that they would provide services to at least 25 persons per 1000 people in their target population (yellow coded).

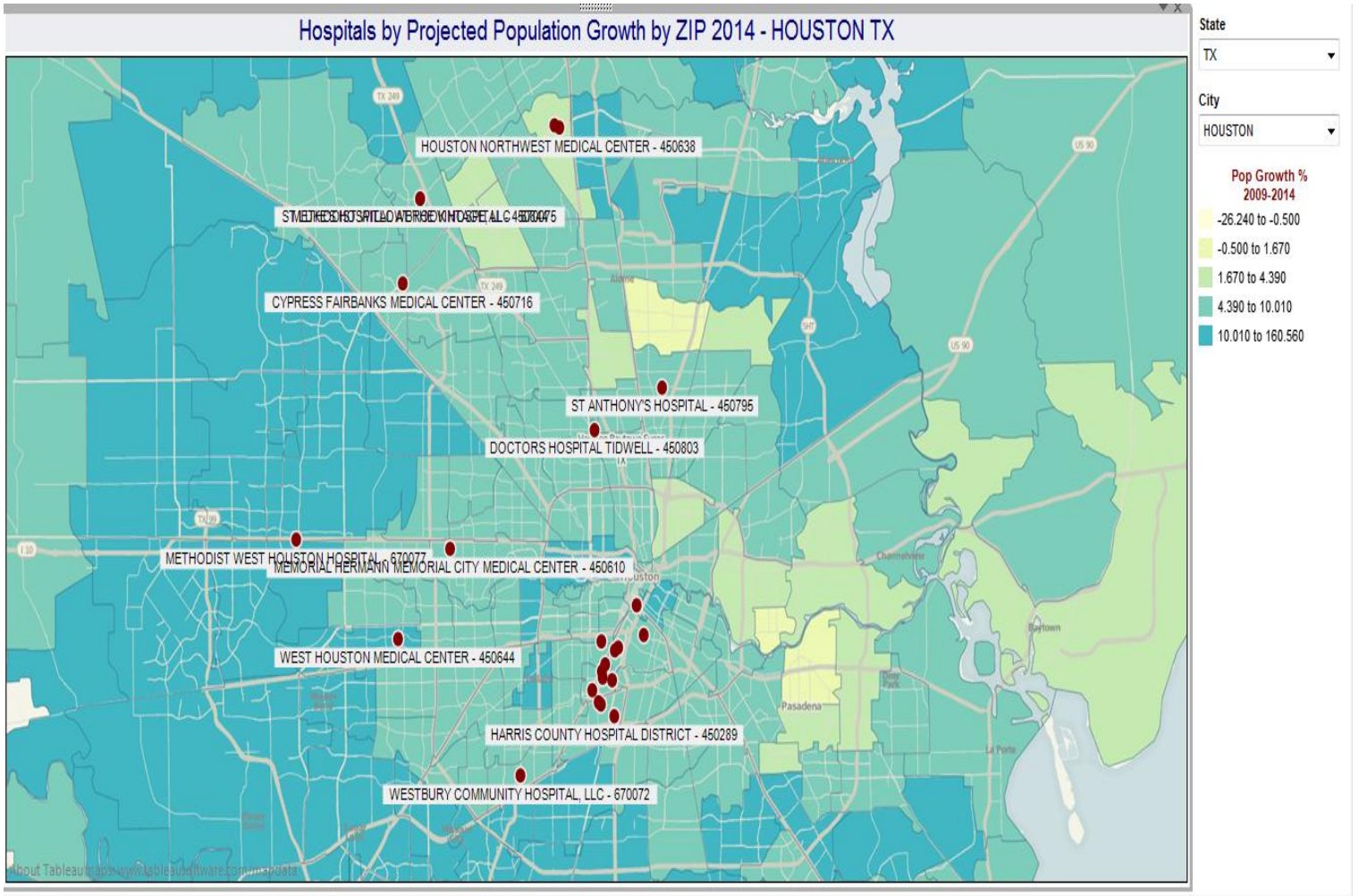
Counties with a service penetration rate of 50 or more per 1000 were coded as exemplary (green).

Counties with a service penetration rate below 25 per 1000 (red) were provided technical assistance and improvement plans.

Geo-mapping is most effective as interactive data visualizations where users can switch between displaying numeric values vs county names or can click to animate the performance over time, or can drill down and across to other info of interest.

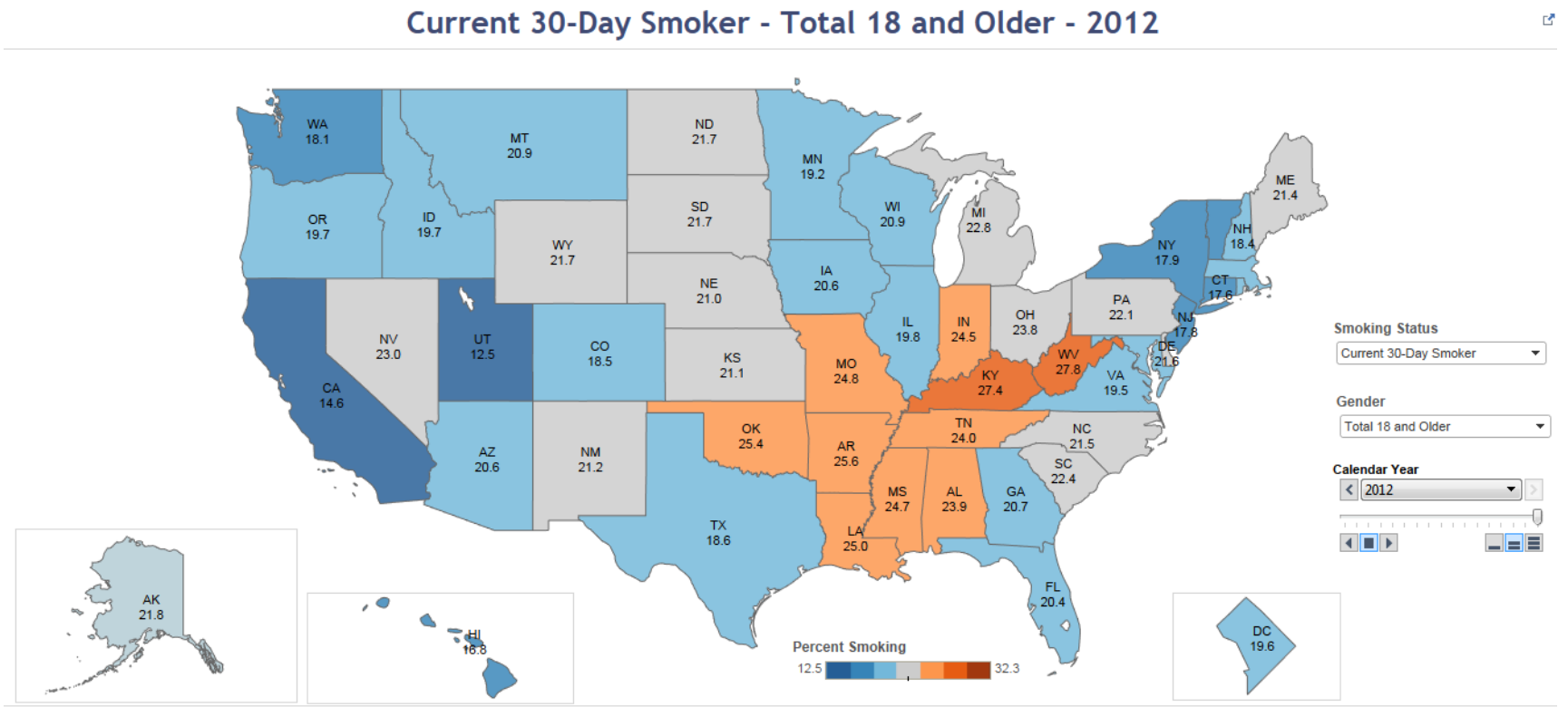
Planning by Geography

Assessing the best locations for future hospitals in Houston based on projected population growth by ZIP Code and by the presence of existing hospitals.



Geography Color Segmenting – Adult Smoking Rates 2012

Decide the best approach to color segmentation. Is it most informative to have an equal number of states in each color segment – or color segments equally wide – or it is more useful to highlight the target outliers and contiguous geographic patterns – or are there natural breakpoints for your color segmentation decision – or are there thresholds (such as the Healthy People 2020 goals) that you would want to use to color-code state progress.



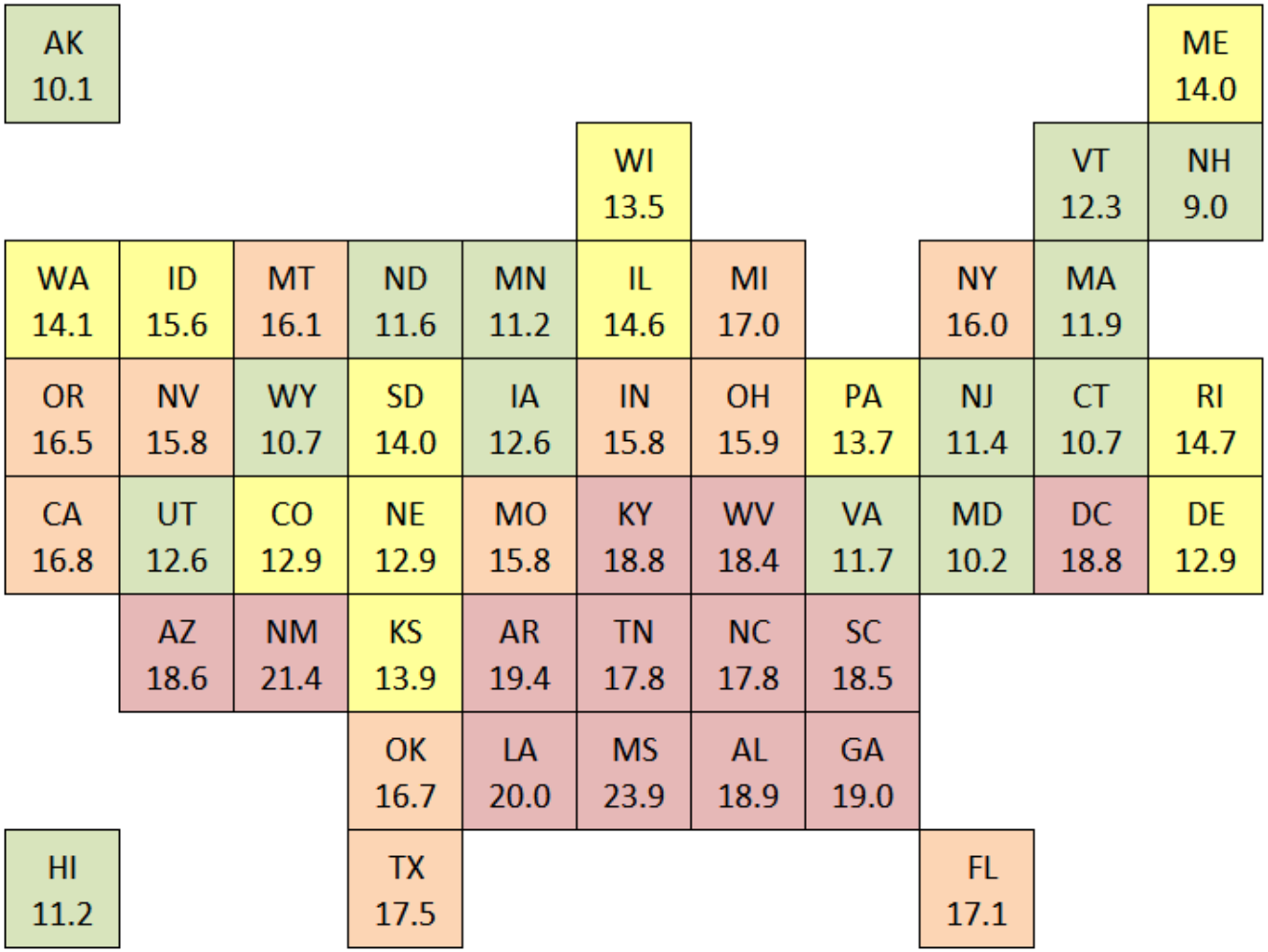
Source: CDC BRFSS

Geo-Mapping Ignoring State Size

- Texas is geographically large in size, Rhode Island is small.
- Viewers will always notice the color shading for Texas and usually not notice the color shading for Rhode island.
- If you want all states to be equally noticed, but still want a map-like display, can attempt a map schematic in which each state is represented by an equally-sized square - which can be color-coded and value-labelled.
- Note that all equal-size state schematics will involve inevitable misalignments of states and their adjacency to one another.
- But such an approximate display may be useful in certain circumstances.
- See example map schematic on next slide.

Map Schematic With Equal-Sized States

Percent Living in Poverty – Below 100 FPL – All Ages - 2013



Source: Census - Small Area Income and Poverty Estimates Program