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Using the 2023 Rural Population Health Chartbook

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Rural Health Gateway Webinar

March 28, 2023

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Webinar Goals

- 2023 Rural Population Health Chartbook released in February. https://www.shepscenter.unc.edu/download/25553/

1. Explain the contents of the chartbook.
2. Show you how to read the charts and use them in your state.
3. Make you think about what kind of person you are.

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Finding the right data to share the rural story

Many chartbooks out there in addition to ours. These are national chartbooks. They provide definitions, methods, and sometimes goals and strategies. But many of them don't stratify for rural.

- *CDC Health, United States* Annual Report (2020-21) - https://www.cdc.gov/nchs/data/hus/hus20-21.pdf
- Additional Resources – not chartbooks
  - RWJ County Health Rankings & Roadmaps - https://www.countyhealthrankings.org/explore-health-rankings
  - Office of Minority Health – Minority Population Profiles - https://www.minorityhealth.hhs.gov/omh/browse.aspx?lvl=2&lvlid=26
  - Health People 2030 - https://health.gov/healthypeople/objectives-and-data
  - State Centers for Health Statistics

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Yay! Rural Data – Wait, which one is right for me?

National Rural-Urban Comparisons

- **2021 AHRQ Chartbook on Rural Healthcare: National Healthcare Quality and Disparities Report** https://www.ahrq.gov/sites/default/files/wysiwyg/research/findings/nhqrdr/chartbooks/2019-qdr-rural-chartbook.pdf
- **2014 Update of the Rural-Urban Chartbook** - https://ruralhealth.und.edu/projects/health-reform-policy-research-center/pdf/2014-rural-urban-chartbook-update.pdf

Regional rural health data tools

- **2021 Rural Border Health Chartbook** https://www.ruralhealth.us/NRHA/media/Emerge_NRHA/PDFs/2021-Rural-Border-Health-Chartbook-compressed.pdf
- **2021 Rural Delta Region Map Tool** https://www.shepscenter.unc.edu/programs-projects/rural-health/projects/delta-region-map-tool/

Individual state rural health chartbooks

- **2020 Northern Border Regional Commission State and Region Chartbooks: A Health-Focused Landscape Analysis –** (ME, NH, NY, VT) https://www.ruralhealthresearch.org/projects/990
- **2022 Rural Health Care in Minnesota: Data Highlights MN Rural Health Care Chartbook** - https://www.health.state.mn.us/facilities/ruralhealth/docs/summaries/ruralhealthcb2022.pdf

County and state-level rural data

- **RHIhub's Rural Health Data Explorer** https://www.ruralhealthinfo.org/data-explorer (data 2006-2009) - provides downloadable county and state level data, stratified by rural and urban
- **2022 NORC at the University of Chicago Rural Health Mapping Tool** - https://ruralhealthmap.norc.org/ (includes COVID-19)

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What makes our chartbook different?

1. Focus on **county-level data** to show **variation** within states.
2. Emphasize **distribution/range** of county rates for each indicator in each state (vs focusing on averages).
3. Compare each state's county rates to all U.S. county rates.
4. Show how population health indicators vary across the country, by region, and by state.
5. Compare rural and urban.
6. Designed to allow for single-page compilations (i.e., you can create a smaller chart pack for your state).

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Uses for chartbook

Chartbook is organized to help distill a large amount of data into useful bites to help:

- **Focus on pressing issues** - See which issues might be more urgent compared to others.
- **Identify disparities** - Identify areas where rural residents have poorer health outcomes compared to their urban counterparts.
- **Position your state among other states** – See how your states rates compare to other states for the same indicator.
- **Look for regional patterns** - Determine if you want to work with similar counties in other states.

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Data in the chartbook

We used public-use data sources. Each provides county-level data.

1. **County Health Rankings & Roadmaps**, 2012-2016. University of Wisconsin Population Health Institute. Available at: www.countyhealthrankings.org.
2. **Provider of Services**, 2016. Centers for Medicare & Medicaid Services. Available at: https://www.cms.gov/Research-Statistics-Data-and-Systems/Downloadable-Public-Use-Files/Provider-of-Services.
3. **American Community Survey**, 2012-2016. U.S. Census Bureau. Available at: https://www.census.gov/programs-surveys/acs/data.html.
4. **Housing and Transportation** (H+T®) Affordability Index, 2017. The Center for Neighborhood Technology. Available at: https://htaindex.cnt.org/.
5. **Compressed Mortality File**, 2012-2016. CDC Wonder. Centers for Disease Control and Prevention. Available at: https://wonder.cdc.gov/mortsql.html.
6. **Rural Atlas**, 2011-2015. Economic Research Service, U.S. Department of Agriculture. Available at: https://www.ers.usda.gov/data-products/atlas-of-rural-and-small-town-America.

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Data in the chartbook continued

- Rural definition = **non-metro counties**

  The Office of Management and Budget (OMB) designates counties as Metropolitan, Micropolitan, or Neither.

Area or County	Rural or Not Rural
Metro area (urban core of 50,000 or more people)	Not rural
Micro area **(urban core of 10,000-49,9999 people)**	Rural
Counties outside of Metro or Micro Areas	Rural

https://www.hrsa.gov/rural-health/about-us/what-is-rural

- 33 indicators
- 5 health domains
  - Access,
  - Health Risk & Outcomes,
  - Mortality,
  - Social Determinants of Health,
  - Socioeconomic
- 3,142 U.S. counties
  - **1,962 rural**
  - 1,180 urban
- > 103,686 data points
  (33 indicators x 3,142 counties)

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What's a great way to condense and display a large amount of data without obscuring the details?

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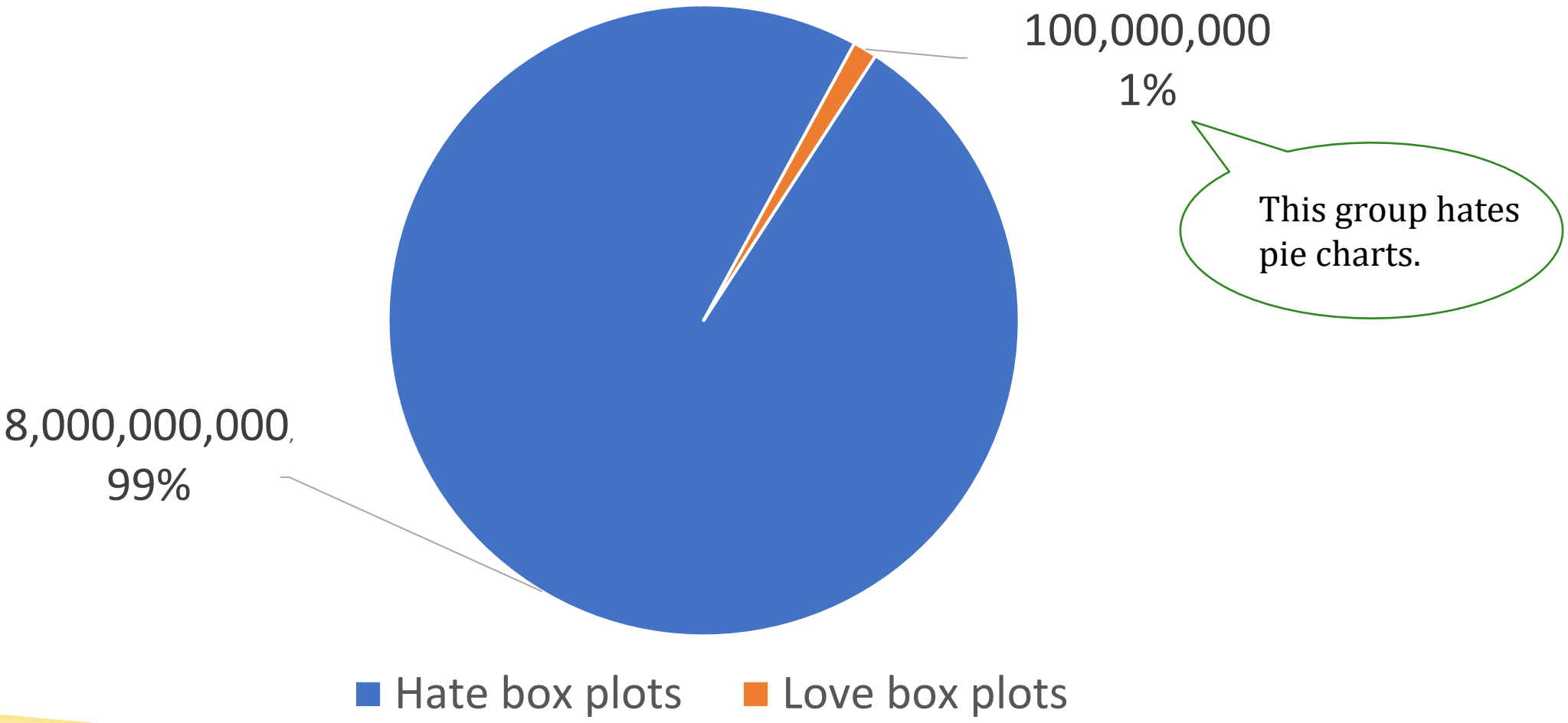
Two kinds of people in the world



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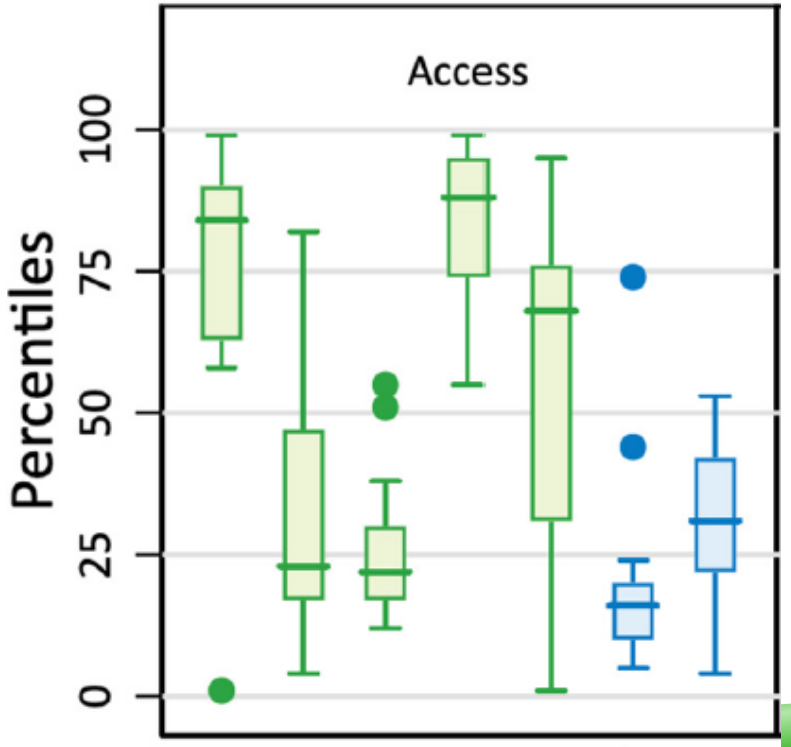
OMG – SO.MANY.BOX.PLOTS!

- We use a ridiculous amount of box plots.
  - 78 pages with 33-45 box plots per page
  - We think this is a **good** thing.



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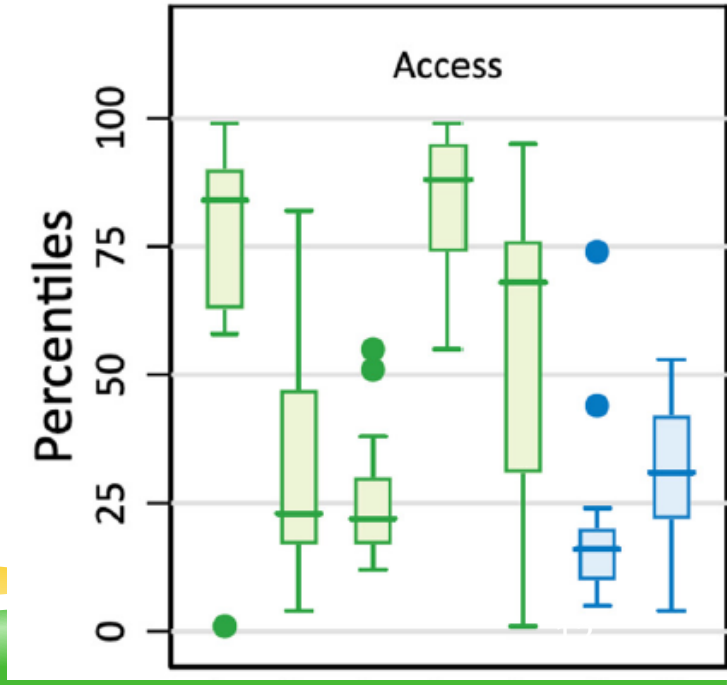
You can ❤ the box plot

Box plots allow us to

- See **distribution/range** of data-not just the avg.
  - Average alone might hide counties doing poorly or exceptionally well.
- See the **spread** of data (how far rates are from center of distribution).
  - How far from “normal” are some of the rates?
- Identify **skewness** of data – is it centered?
  - Are county rates in my state “normal” or more likely to “above or below normal”?
- Compare **distributions/ranges** of multiple sets of data
  - How does my state compare to others?
- Note **unusual observations** (outliers)
  - Are some of counties in my state a lot less healthy or exceptionally healthy? Some values are abnormally far from the middle of the data.



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5 chart types

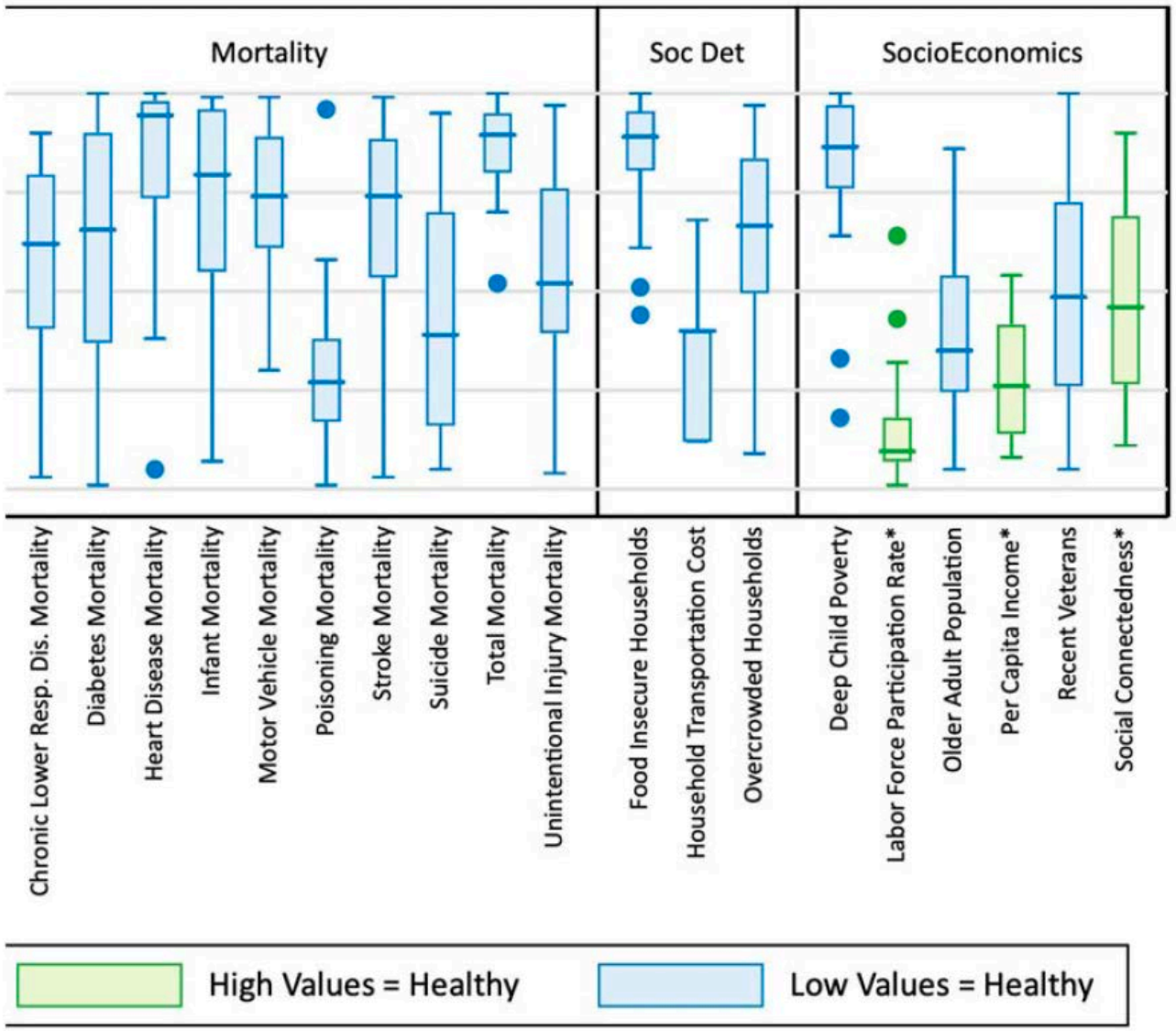
State summary box plots
What are the most pressing issues in my state?

Rural–urban disparity bar charts - (lollipop charts)
How do state rural vs urban averages compare for this indicator?

Indicator box plots by region by state
How does your state compare to other states?
What does the range of data look like?

Sex, race, and ethnicity bar charts
What are the sex, race, or ethnicity disparities in my Division?

National maps
Are there regional patterns for this indicator?



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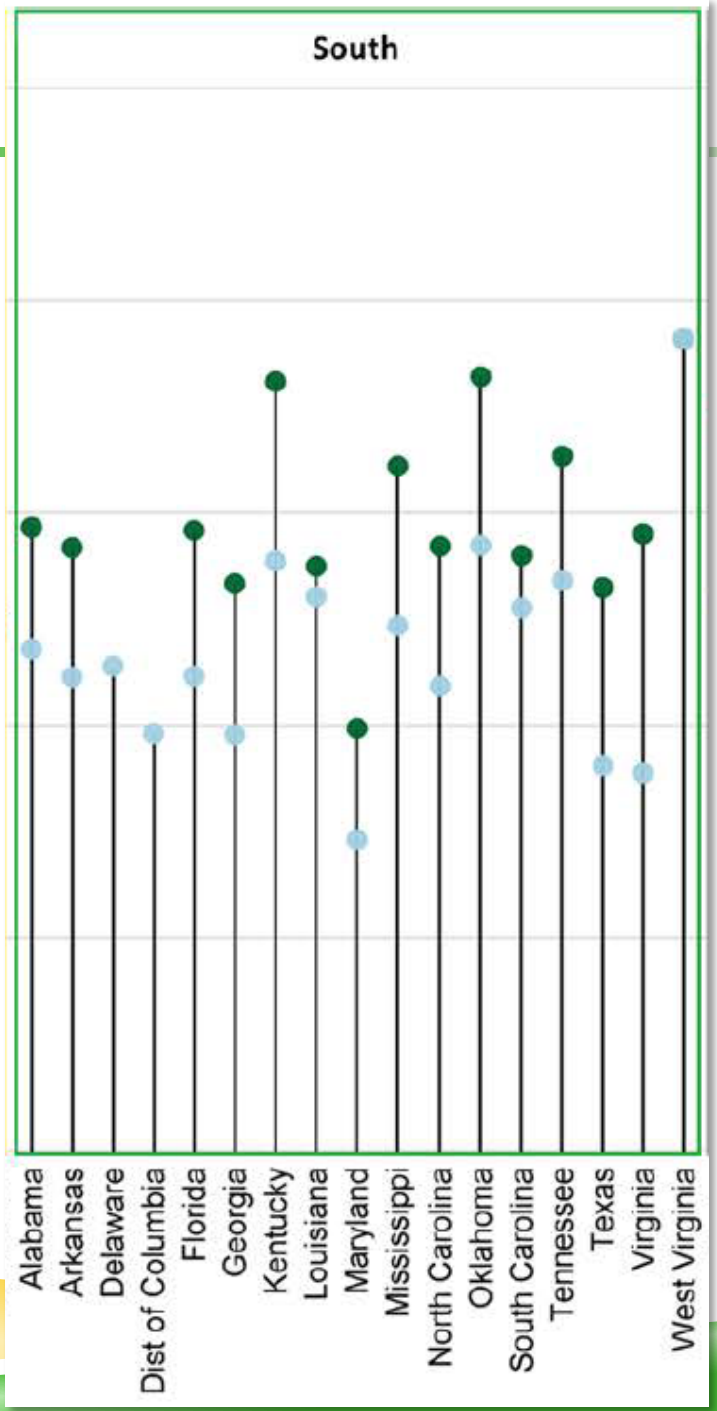

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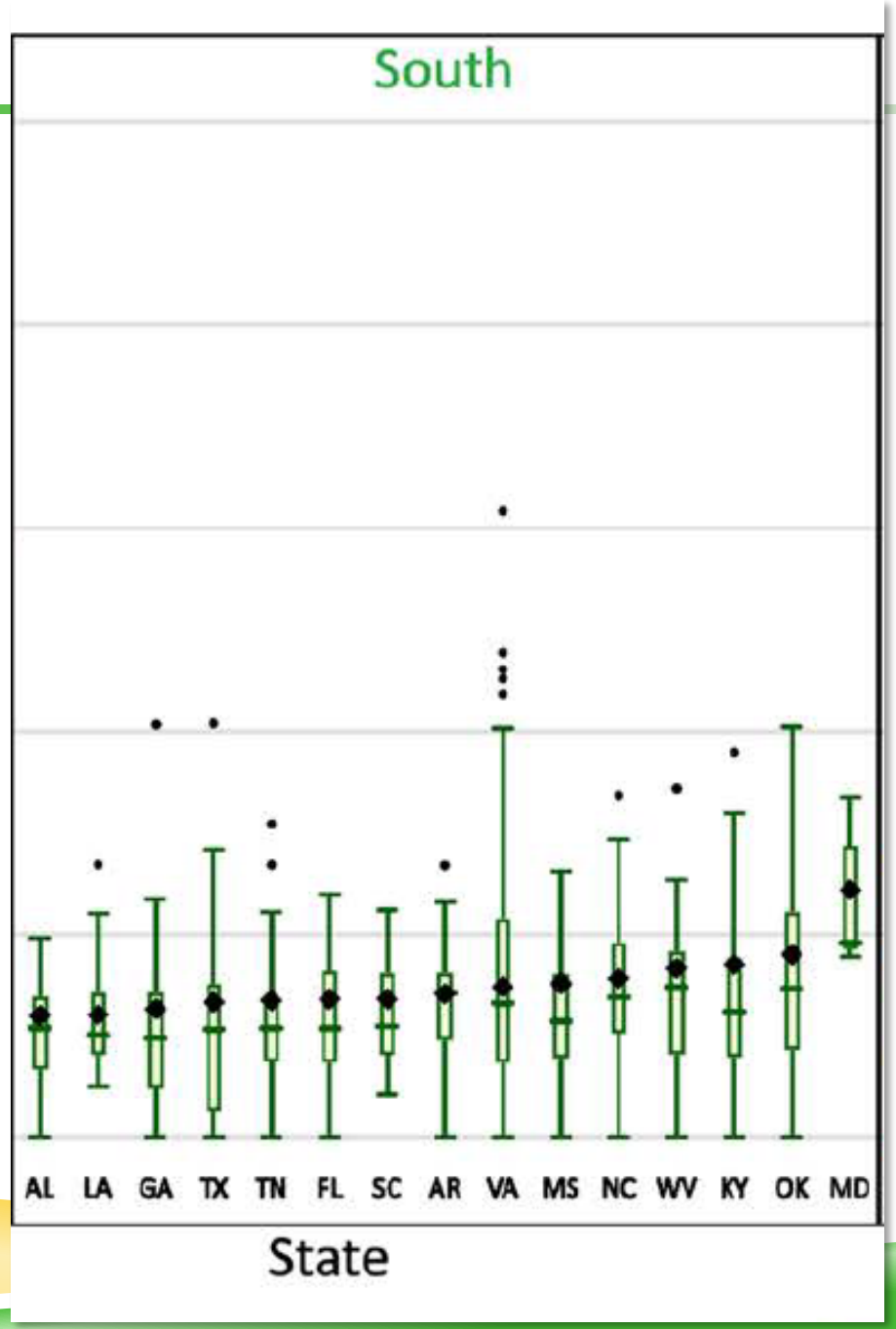

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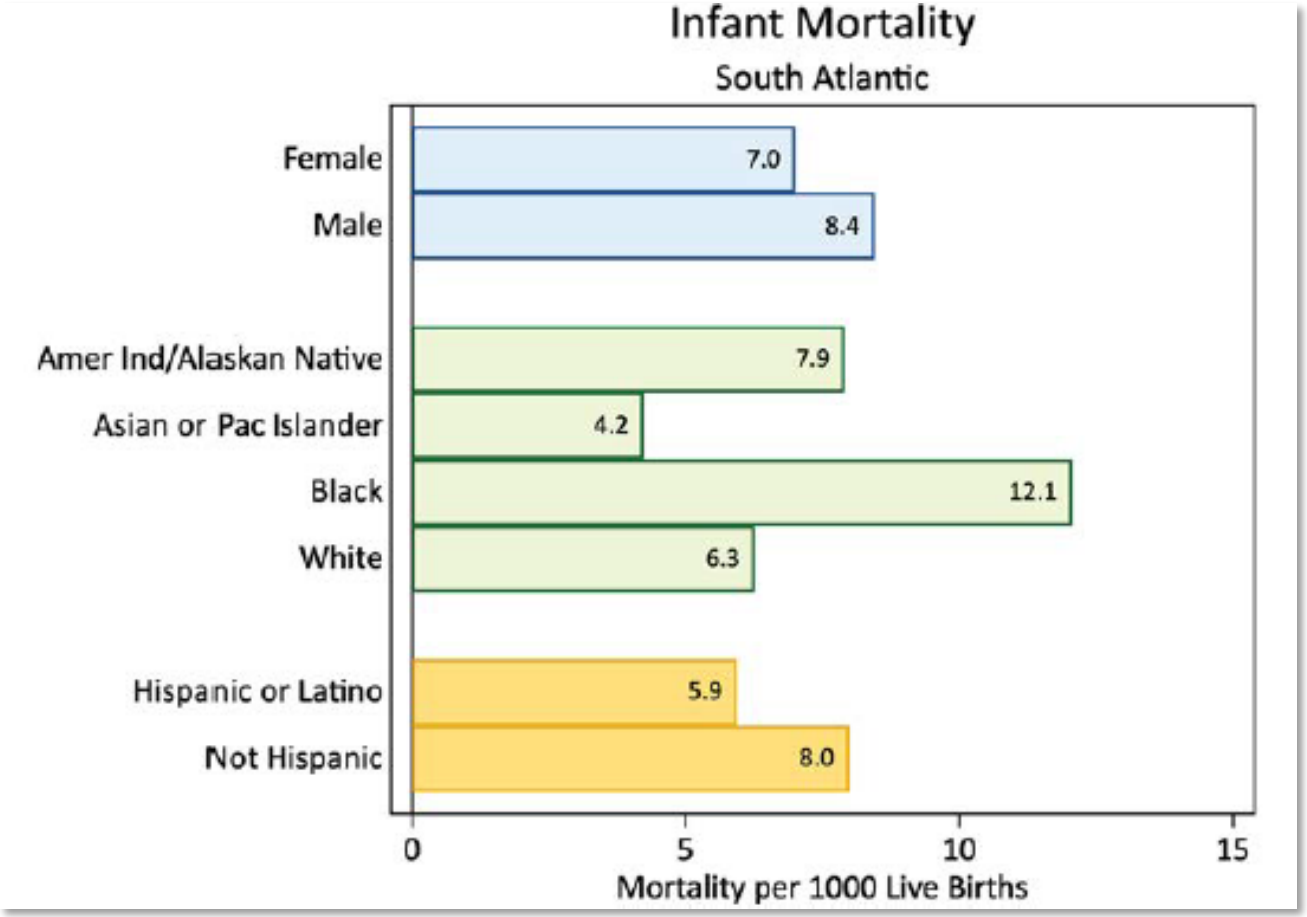

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National maps
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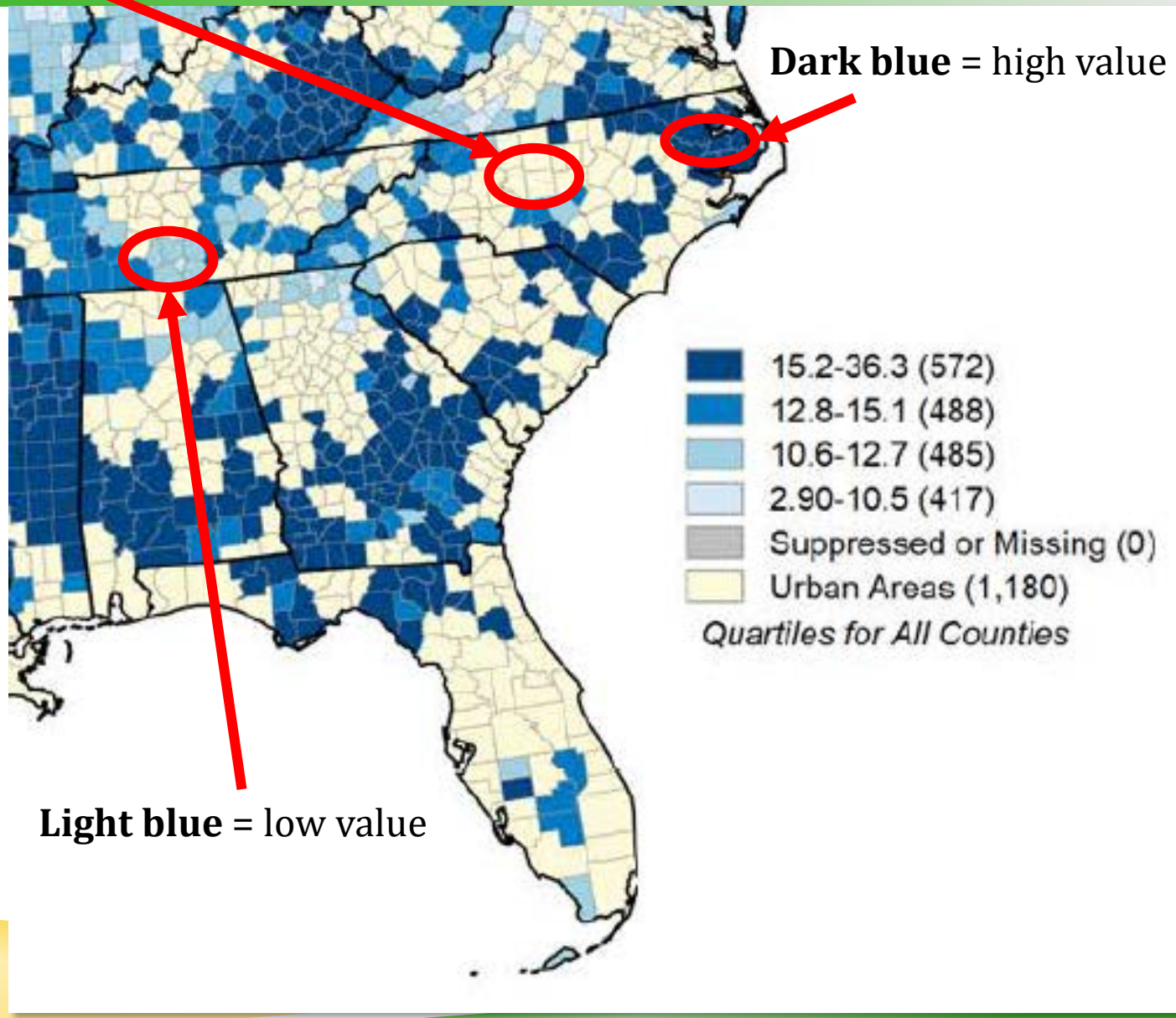
Urban area – map doesn't show value



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Using the charts

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Let's see how we might use the chartbook for rural North Carolina

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What are the most pressing issues in my state?

Do we have rural-urban health disparities?

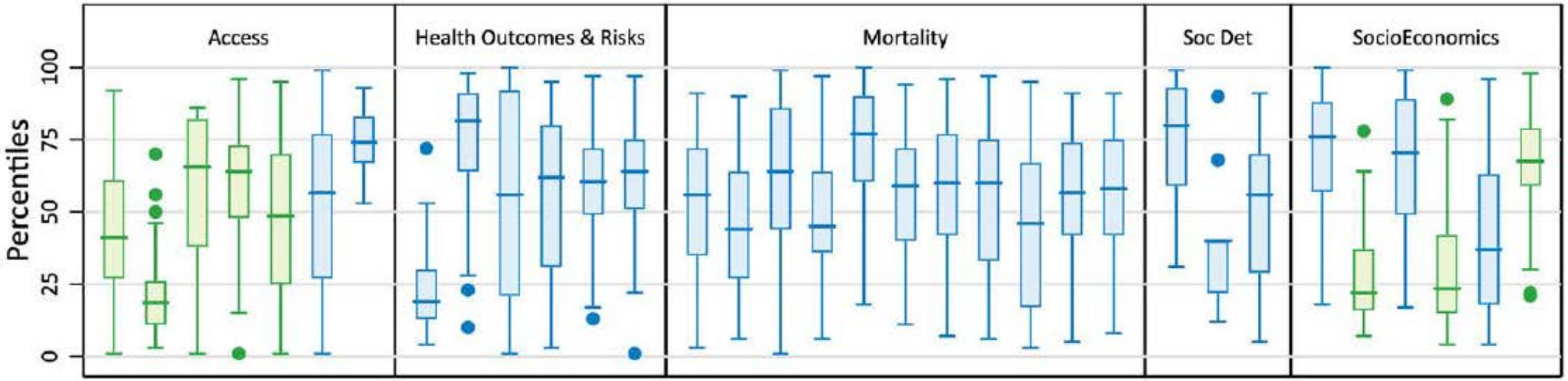
How does my state compare to the rest of the country?

Are we part of a regional issue?

Are there differences based on sex, race, and ethnicity in my division?

State summary box plots

What are the most pressing issues in my state?



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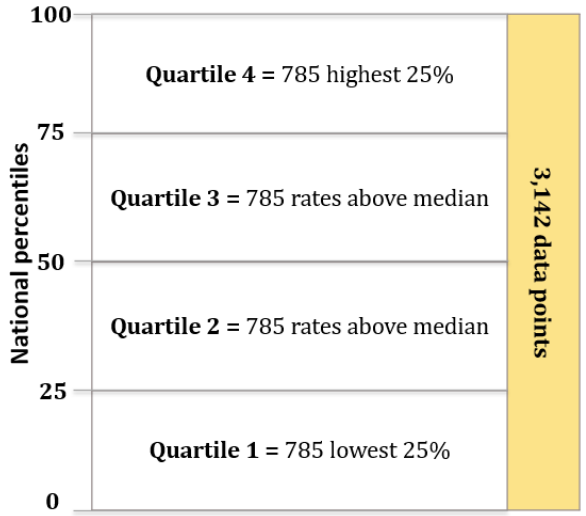
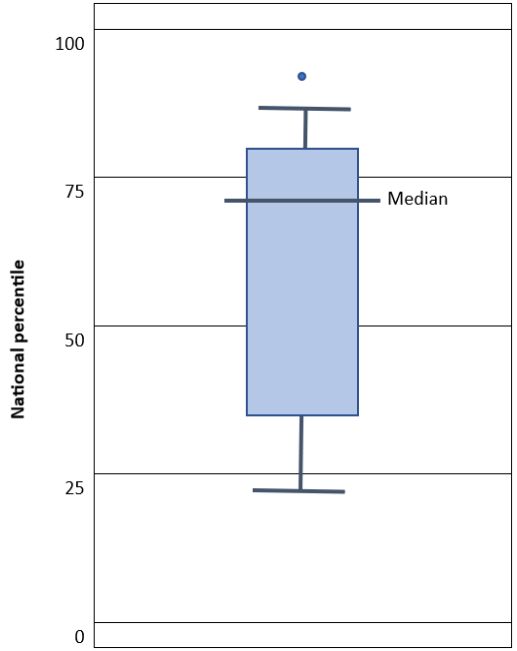
Think of these plots in layers

- Layer 1: Organizes county data on a <u>national level</u>

+

- Layer 2: Organizes county data at <u>state level</u>





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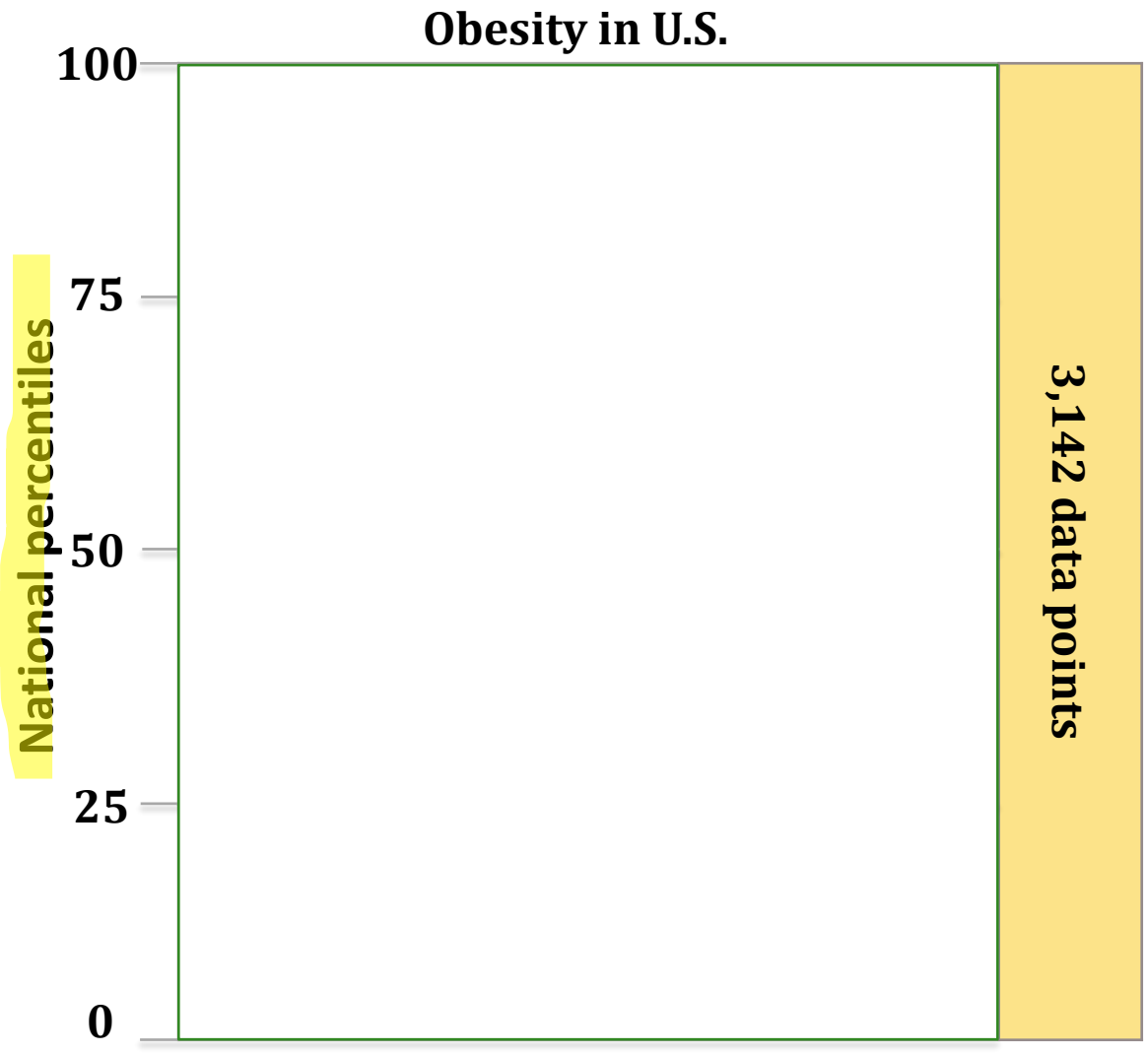
Layer 1: Organizing the data at the national level

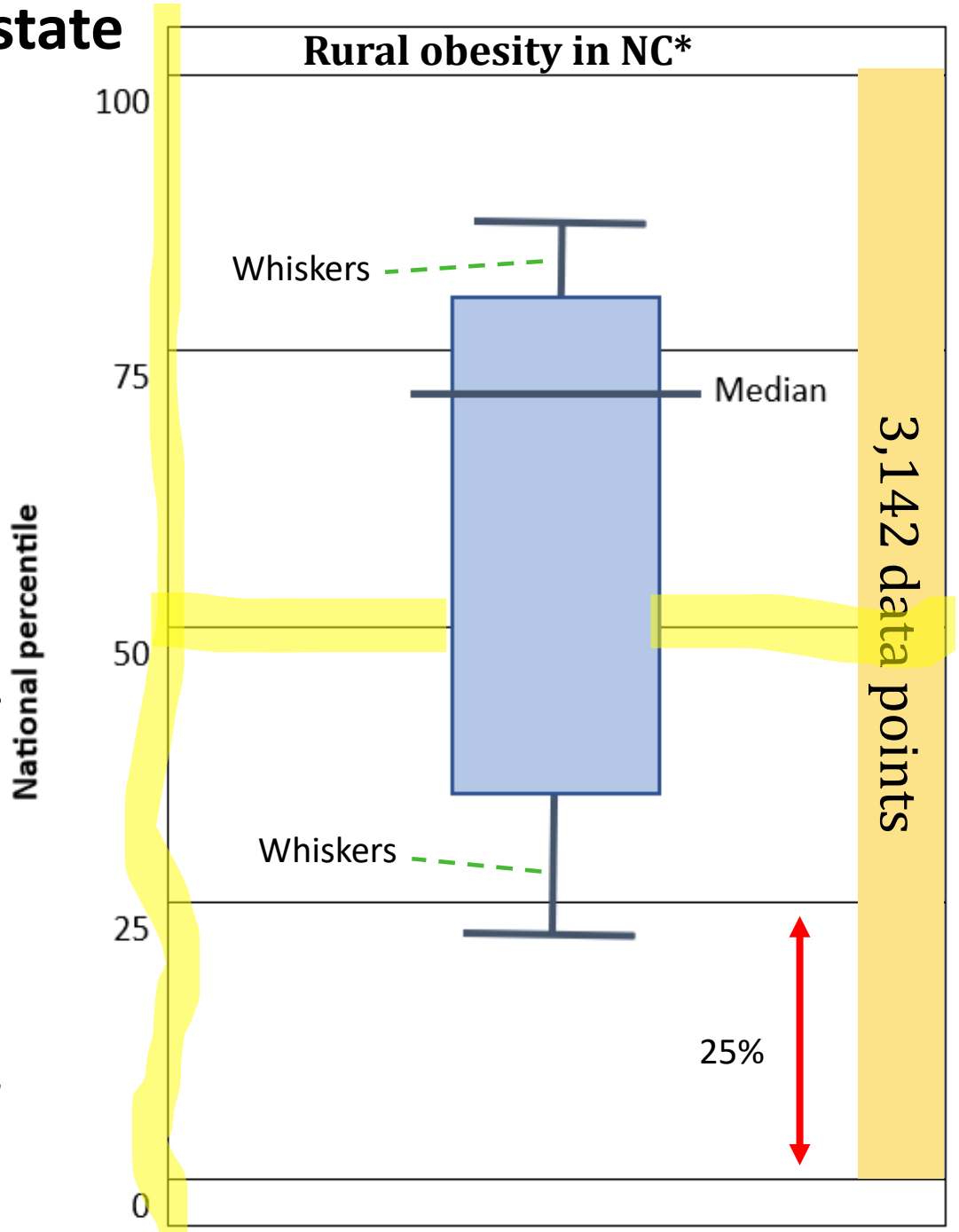
- Think of this as base layer for state summary charts.
- For each indicator, we
  - **collected rates for all U.S. counties** – rural and urban (3,142 counties).
  - **sorted rates (lowest to highest)** - creating a percentile ranking 0%-100%, which allows us to compare the position of one value to others in the data set.
  - **divided rates into 4 equal groups** (quartiles).
  - 3,142 / 4 = ~785 counties per quartile.

  - Next we add layer 2 – a state-level percentile ranking to show where a state's county values are and how they compare to each other.



Layer 2: Adding box plot to capture range of state data

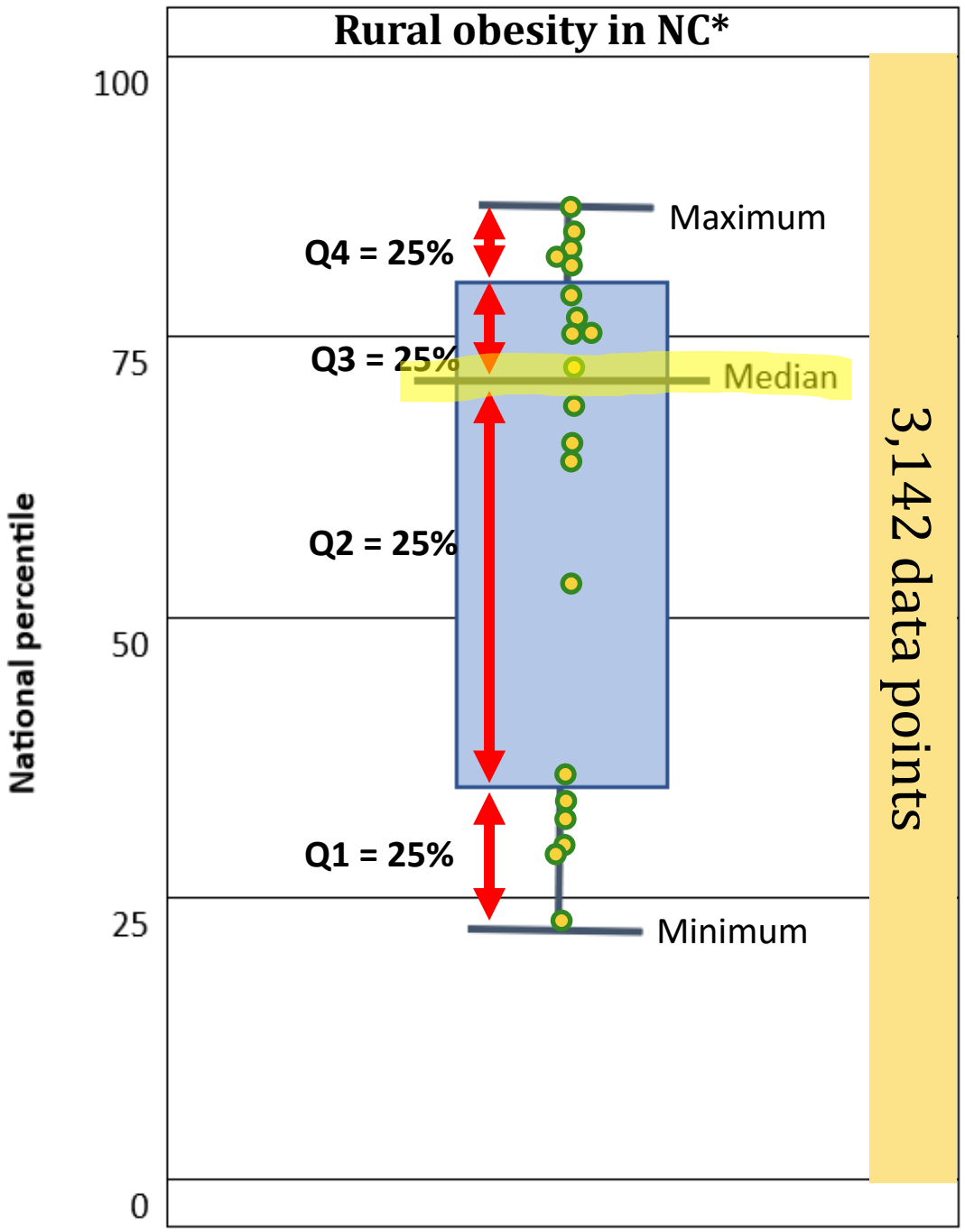
- After organizing all county data points on national percentile scale, want to see how NC data look in comparison.
- Use blue box & whiskers to rank all rural NC county rates. Just like national scale, NC data is ordered from low to high, has 4 equal sections (quartiles), even if they don't look equal.
- As we look more closely at blue box plot, remember
  - Each national quartile = 25% of data points
  - The y-axis is the national scale.
  - 50th percentile = median (**middle** value) for the U.S.
    - Half of all U.S. counties are above 50th percentile, and half are below the 50th percentile.



*This is not real data – for demonstration only.

Data inside the box plot

- Box and whiskers capture where data values are.
  - Pretending NC has 20 rural counties (20 yellow dots) (20/4 = 5 dots in each quartile of the blue box plot)
- **State data also has a middle value -- median (50th percentile)** Half of the rural county data points are below the median and half are above.
- Blue box is drawn around Q2 and Q3 – the data **closest to the middle data point** (median). Half of data values are in blue box. Other half in Q1 and Q4.
- Q1 - **1st quartile** = These are the lowest values for this state.
- Q4 - **4th quartile** = ≥ 75th percentile. Highest values.
- Box plots come in all shapes and sizes depending on variation in data values.

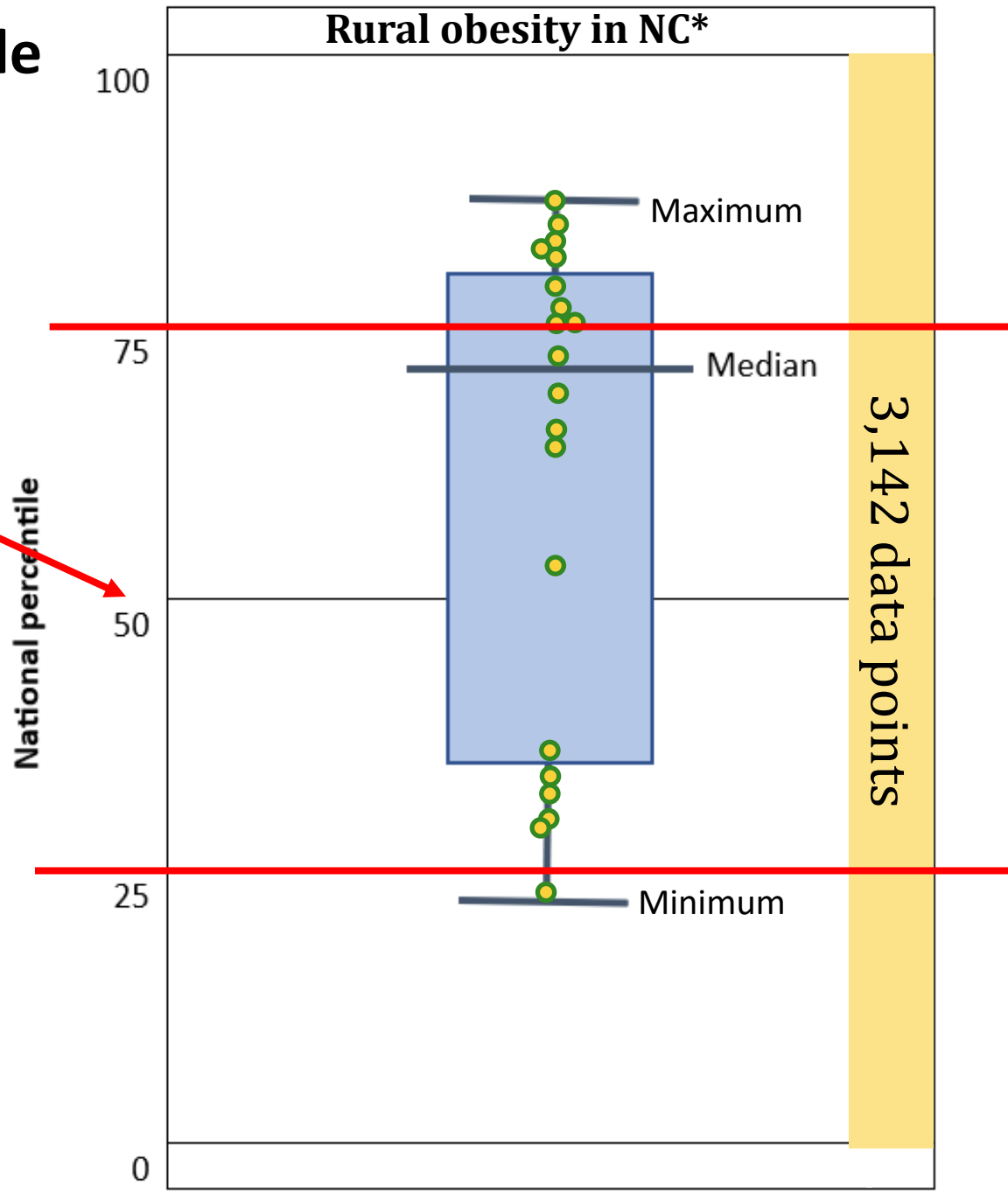


*This is not real data – for demonstration only.

Interpreting the box plot on the national scale

- Obesity rates→higher is worse.
- To see what values are most pressing, we look at those **farthest from the national median**.
- County values near or above the 75th percentile (red line and above) are among the highest 25% in the nation. 75% of rates in nation are lower than these.
- Rates below 25th percentile are among lowest in country. 1 NC county has a rate among lowest 25% in U.S.

- Questions?



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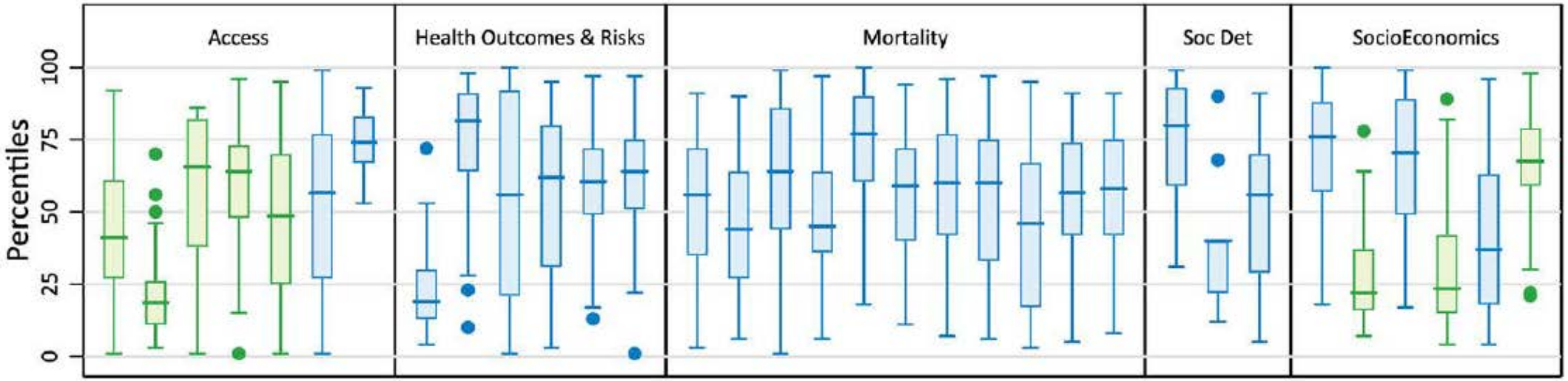
State summary box plots

What are the most pressing issues in my state?



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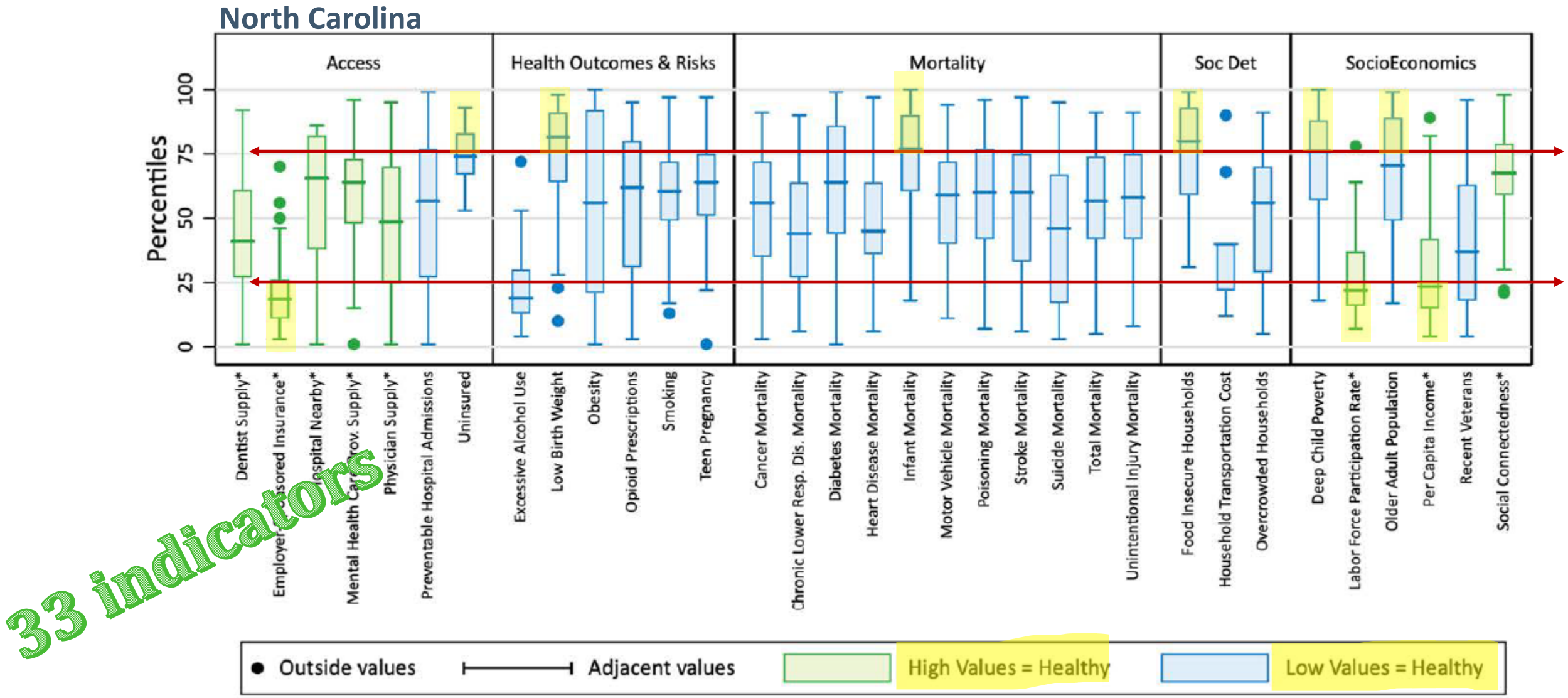
State summary box plot – the Rural county data range for each indicator



Note: Blue boxes are for indicators where higher values denote worse health.
Green indicators, also denoted with a * in the label, are indicators where higher values denote better health.

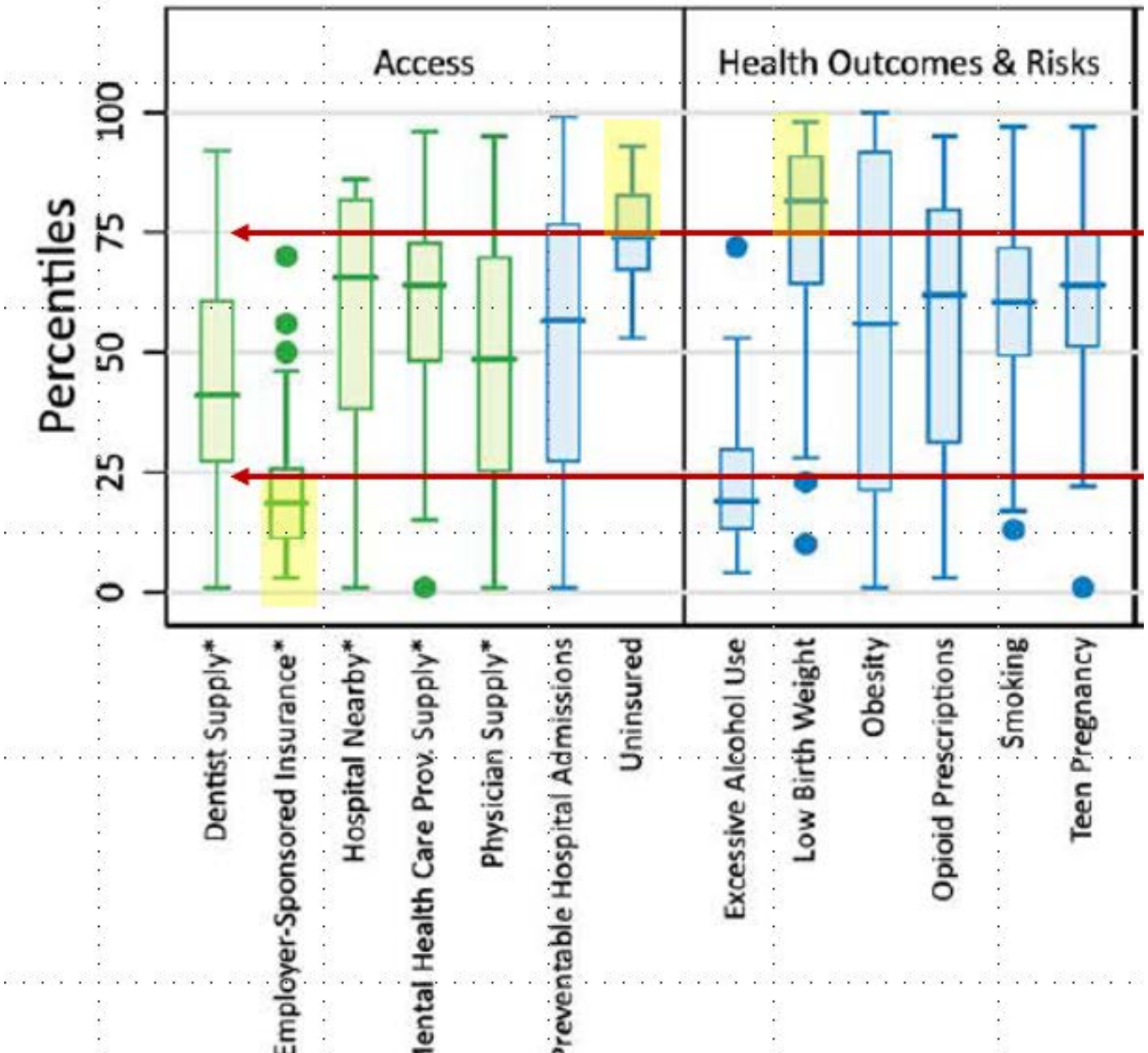
Pressing Issues for Rural North Carolina

In rural North Carolina, highlighted indicators have less healthy rates = most pressing based on those above national 75th percentile.

1. **Employer sponsored insurance rates** – ~ 75% rural NC county rates among lowest in U.S.
2. **Uninsured rates** – ~ 50% of rural NC counties are among the highest 25% of uninsured rates. All rural NC counties have uninsured rates above national median (>50% of all U.S. counties).
3. **Low birth weight –** > half rural NC counties have high LBW rates. Not all rural counties face this problem--outliers are below 25th percentile.

RANGE For some there is wide variation. In access

- Dentist supply, hospital nearby, physician supply, preventable readmissions
- For these indicators, there are counties at both extremes.
- Insurance has a narrow spread – not much variation.



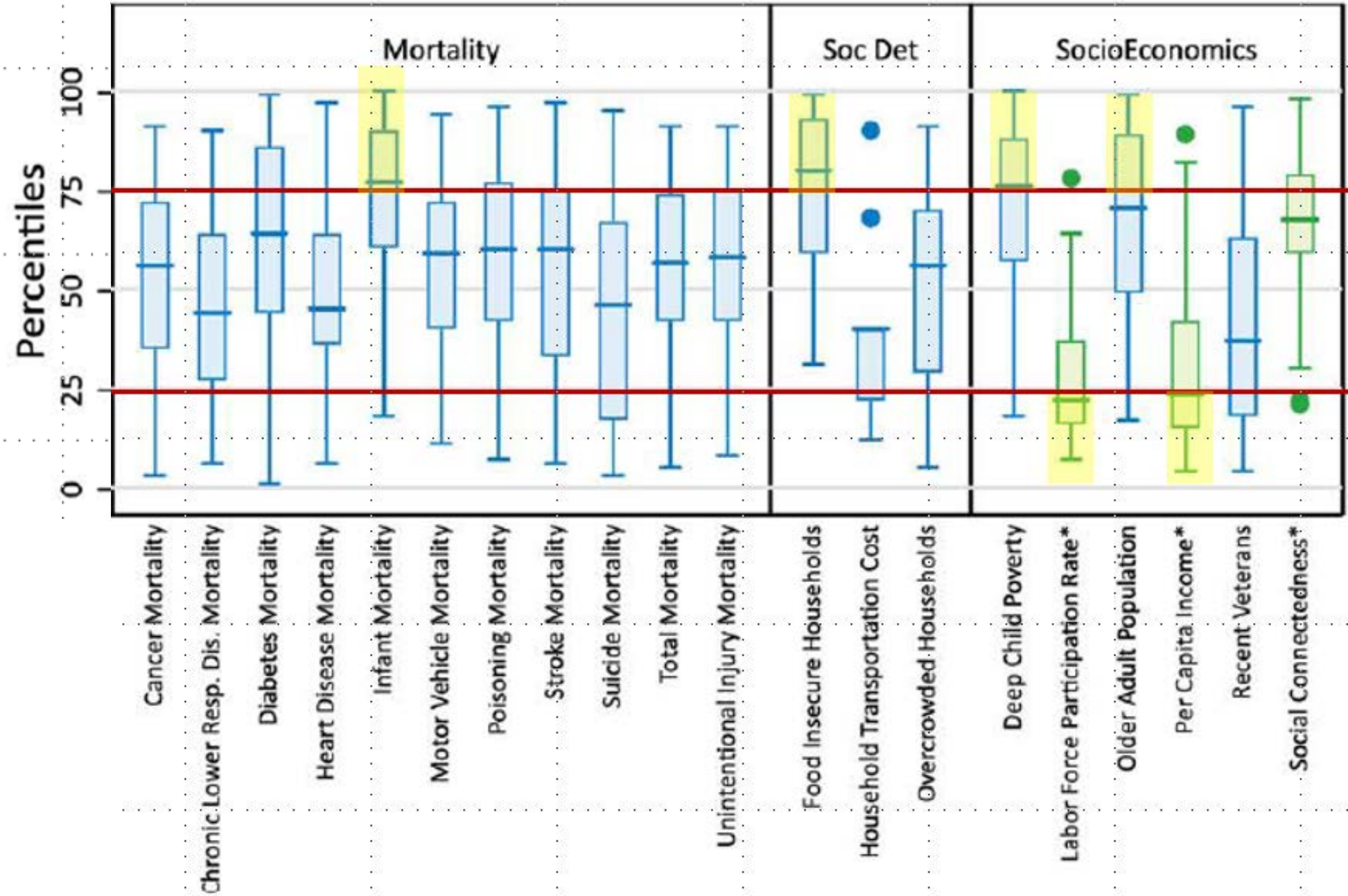
Pressing Issues for Rural North Carolina

In rural NC, highlighted indicators have less healthy rates than most other counties.

1. Infant mortality
2. Food insecurity
3. Child poverty
4. Labor force
5. Per capita income
6. Employer sponsored insurance
7. Uninsured
8. Low birth weight

RANGE – most have broad range with some counties in Q 1 and Q4. Exceptions: Food insecurity (no Q1)

NEXT STEP: Look at other charts to see how some of these pressing issues look.



Rural-urban disparity bar charts (lollipop charts)

How do state rural vs urban averages compare for indicators in my state?

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Are the rural-urban averages different in my state?

Blue dots = <u>average</u> urban values

Green dots = <u>average</u> rural values.

Distance between **green** and **blue** dot = rural-urban difference within state.

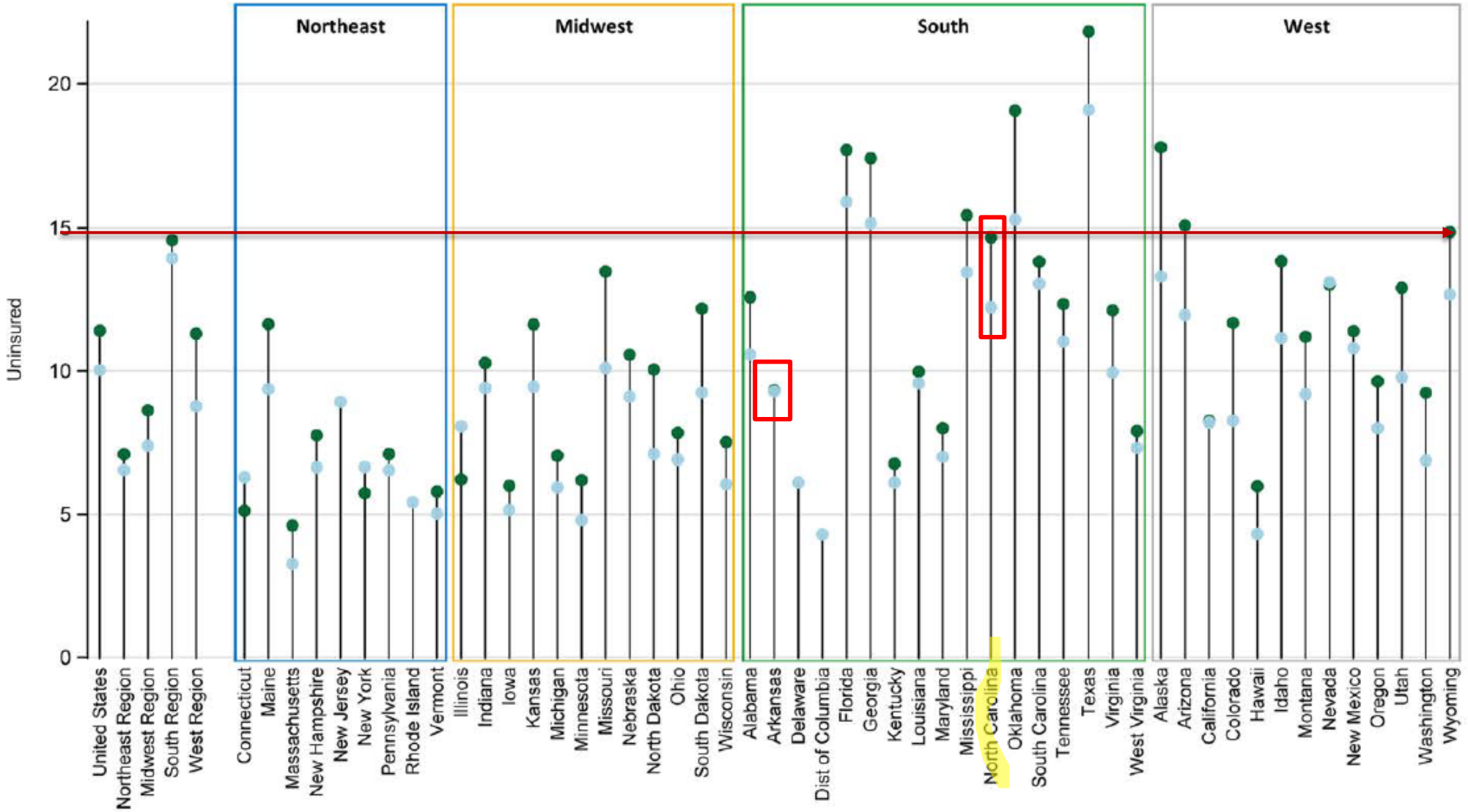
Larger distances between **green** and **blue** dots have larger rural-urban disparities

Grouped by Census Region

Uninsured

Percentage of the population under age 65 without health insurance (2016)

Access to Care Domai



Low Birth Weight

Five-year average percentage of live births with low birthweight (less than 2,500 grams) (2010-2016)

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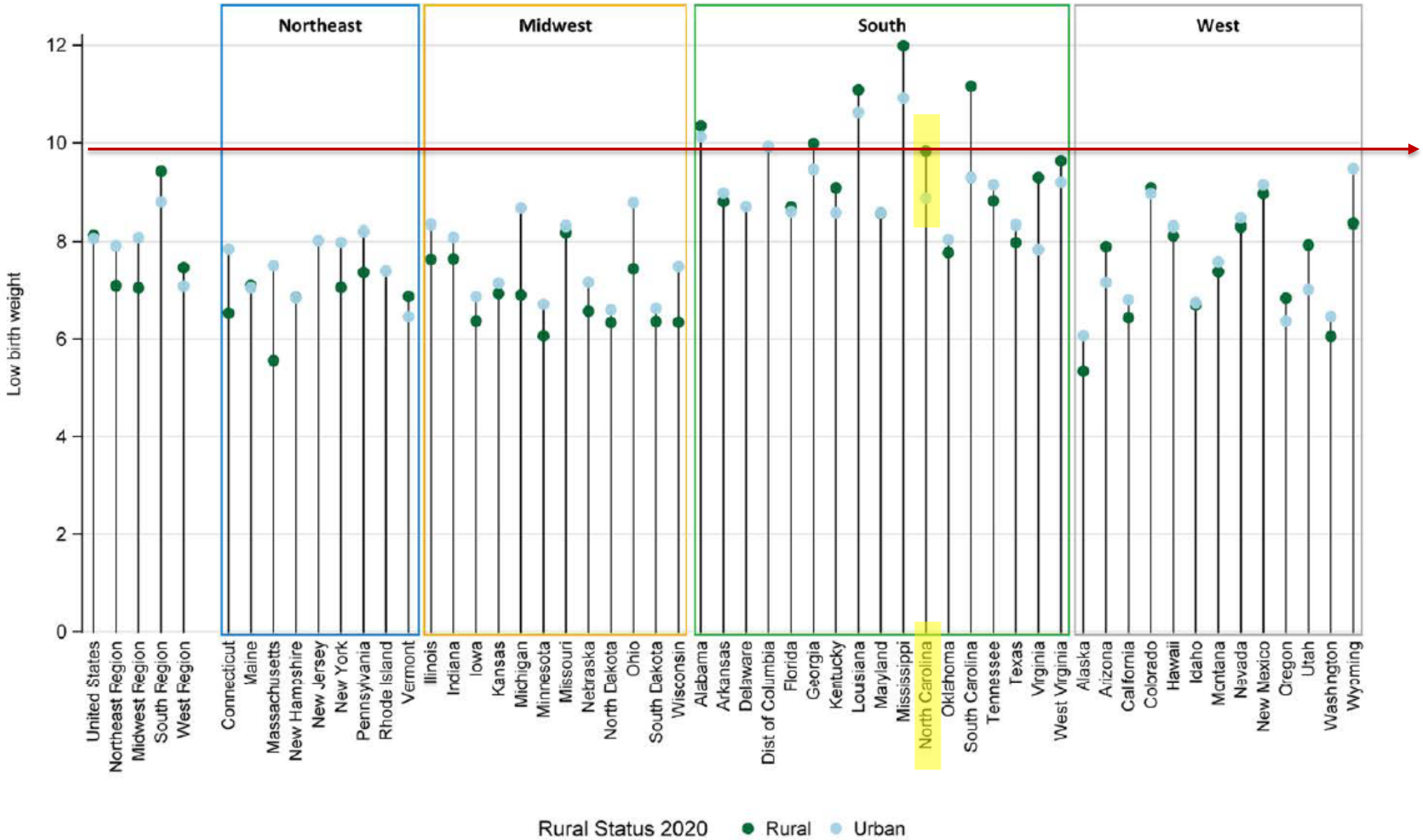
Health Outcomes and Risks Domain

Rural NC <u>average</u> LBW is nearly 10% compared to < 9% in urban.

NC's <u>average</u> rural LBW is higher than many in the region and higher than most other rural state averages.



Indicator box plots by state and region

How does your state compare to other states?

What does the range of data look like in your state?

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Indicators by state

Box plots show **range** of **rural** data in each state.

Grouped by Census Region.

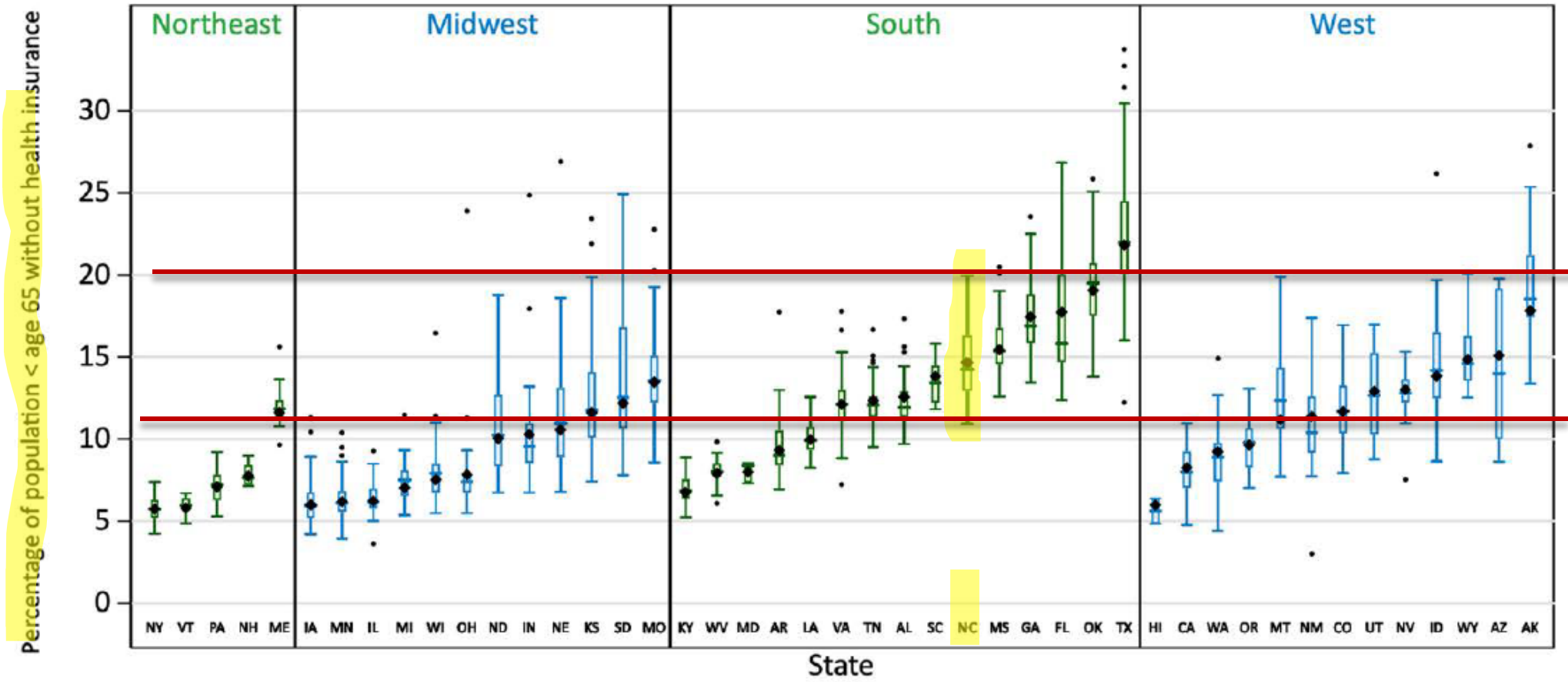
States ordered from lowest to highest in each region using **state's rural average** (the black diamond).

Color has no significance.

Uninsured

Percentage of the population under age 65 without health insurance (2016)

Access to Care Doma



• State rural average ● Outside values ├──┤ Adjacent values ▭ 25th/75th percentiles

Note: States sorted by rural average within region.

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Five-year average percentage of live births with low birthweight (less than 2,500 grams) (2010-2016)

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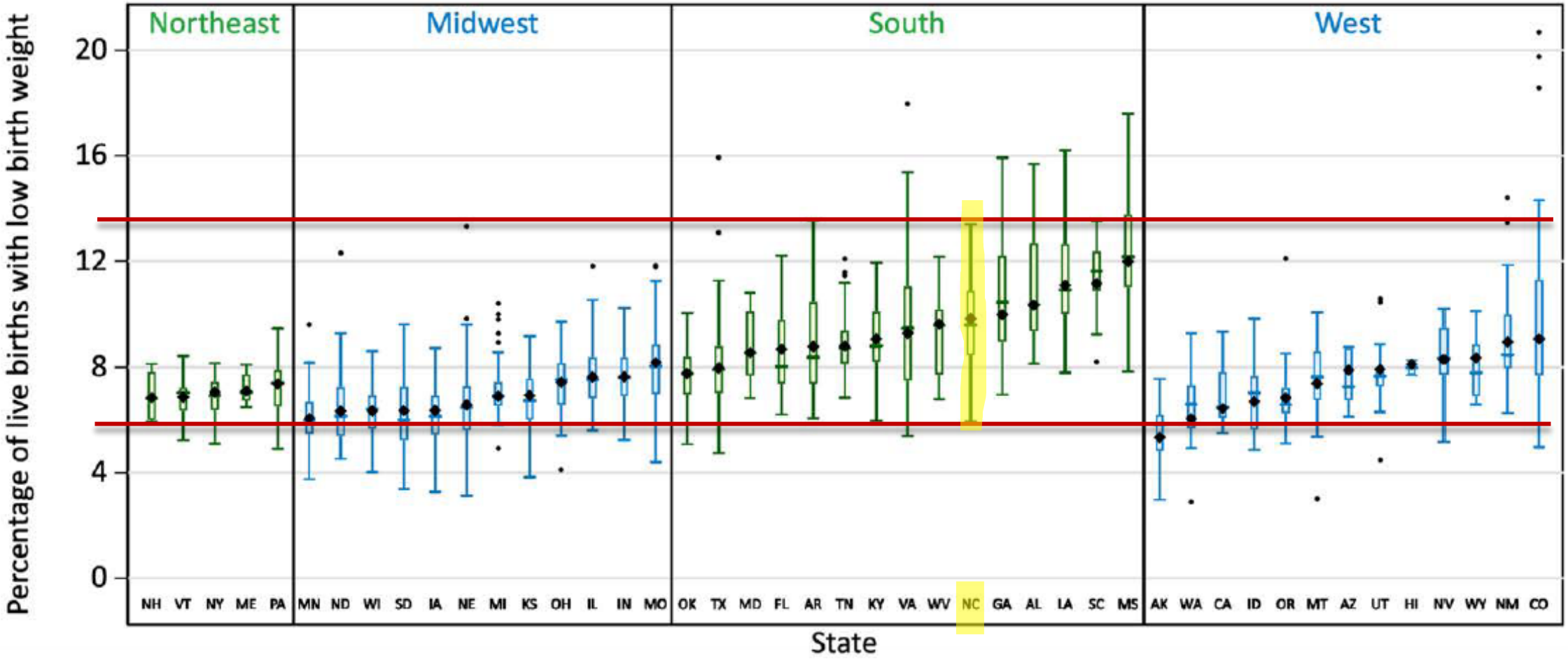
Health Outcomes and Risks Domain



- LBW in NC rural counties ranged from ~6%-14%.
- Most rural counties were above 8%.
- NC is similar to other states in the South

Sex, race, and ethnicity

What are the sex, race, or ethnicity disparities in my Division?

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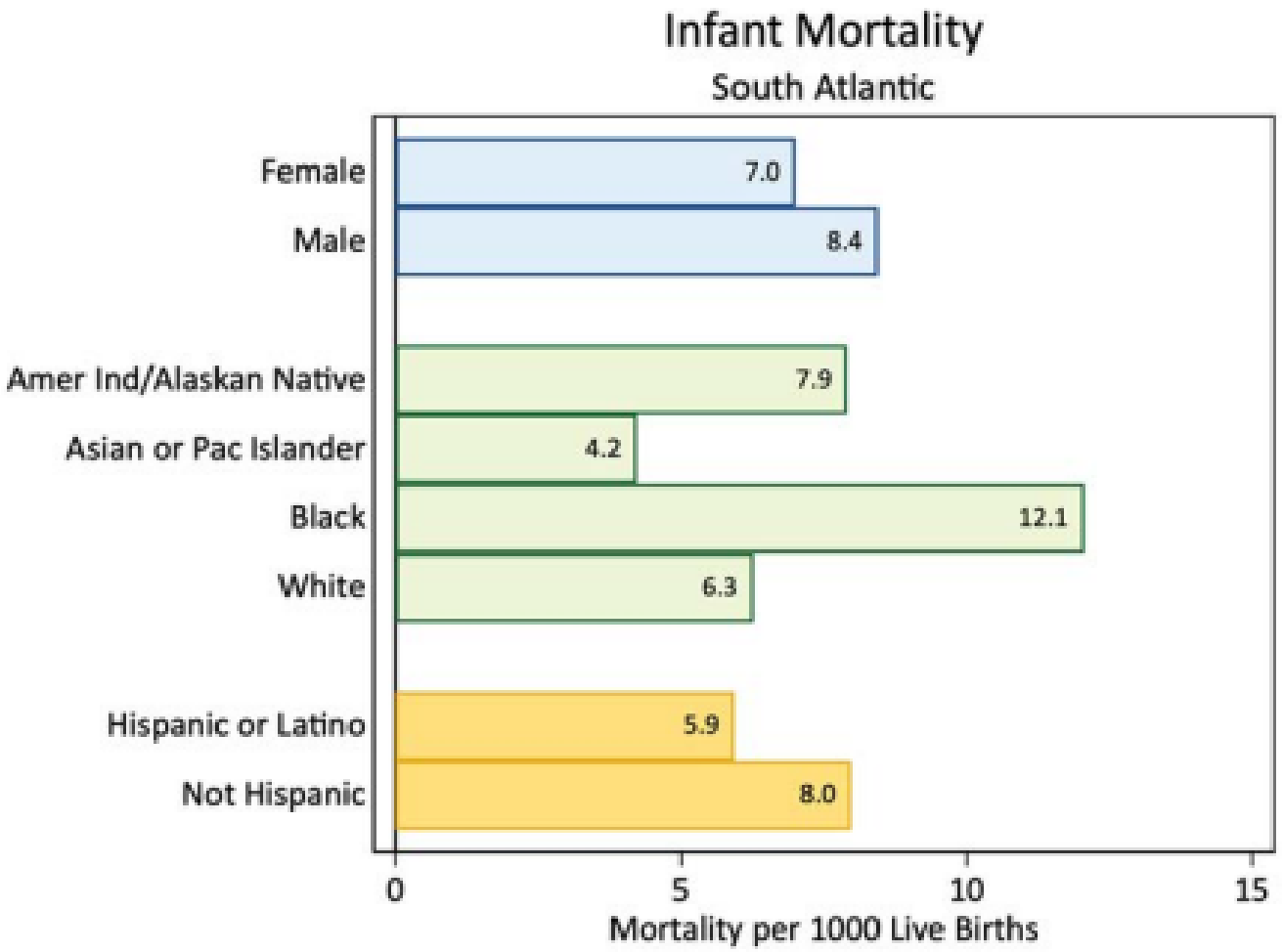
Sex, Race, and Ethnicity by Census Division



- Differences in **sex** and **race, and ethnicity** by Census division.
- **11 mortality indicators** from the CDC Compressed Mortality file.
- By division because of **suppressed** or **missing data**.
- Division trends are likely to be aligned with state trends.

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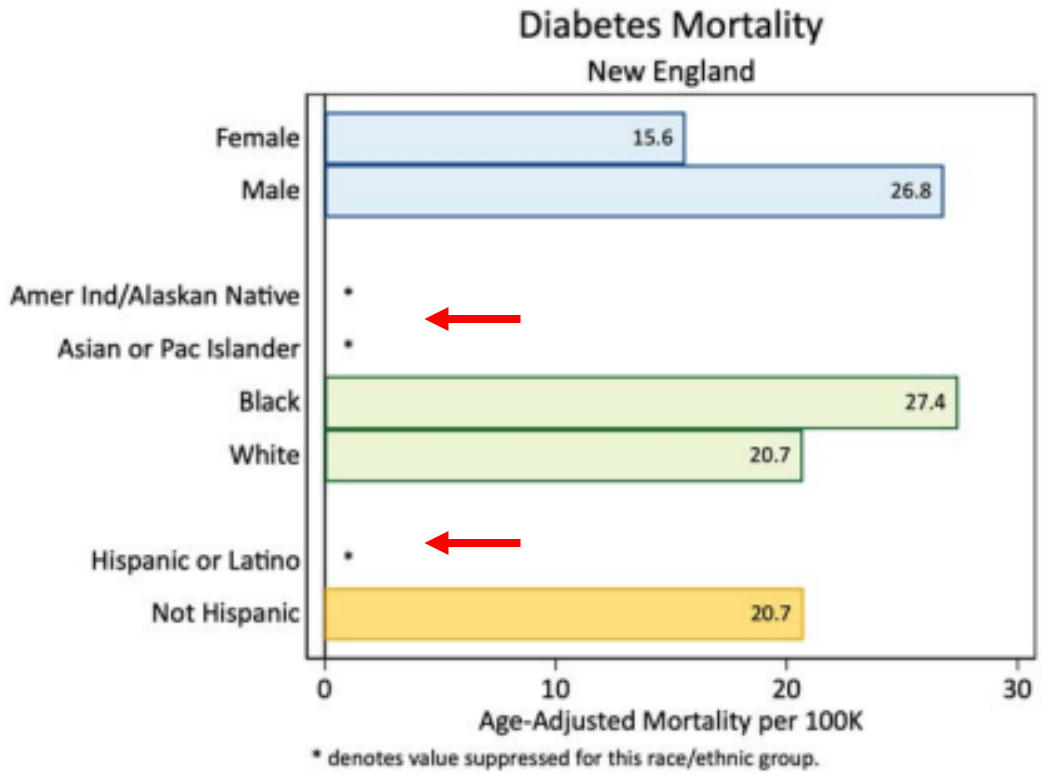
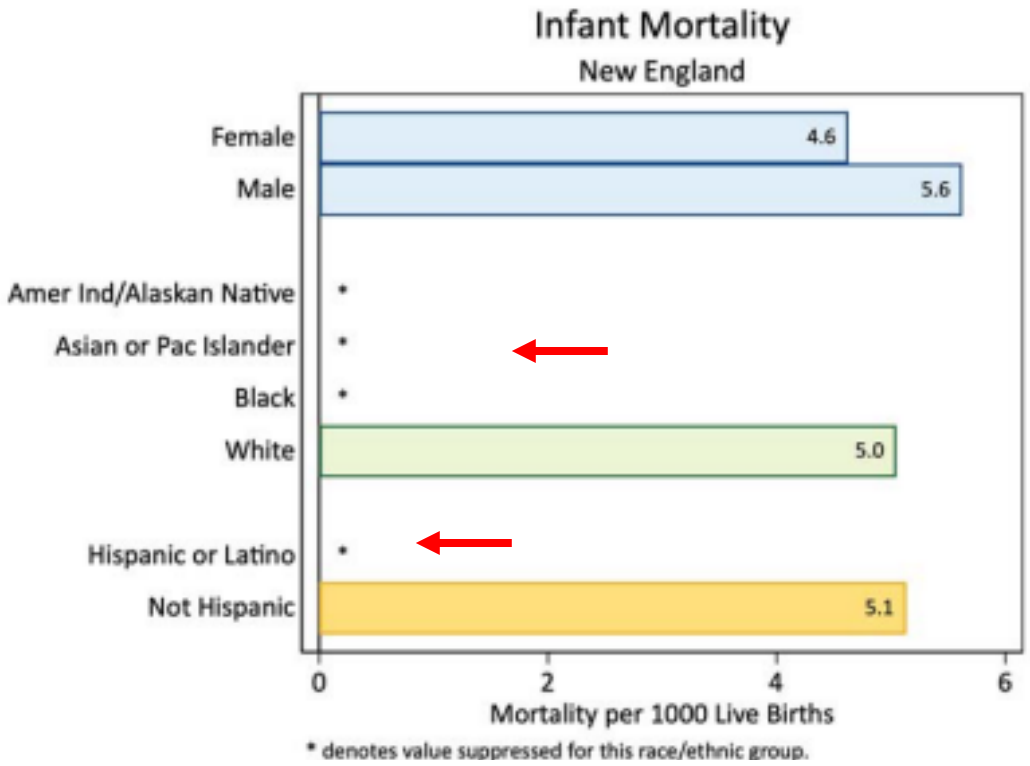
Missing & suppressed data impact seen at the division level

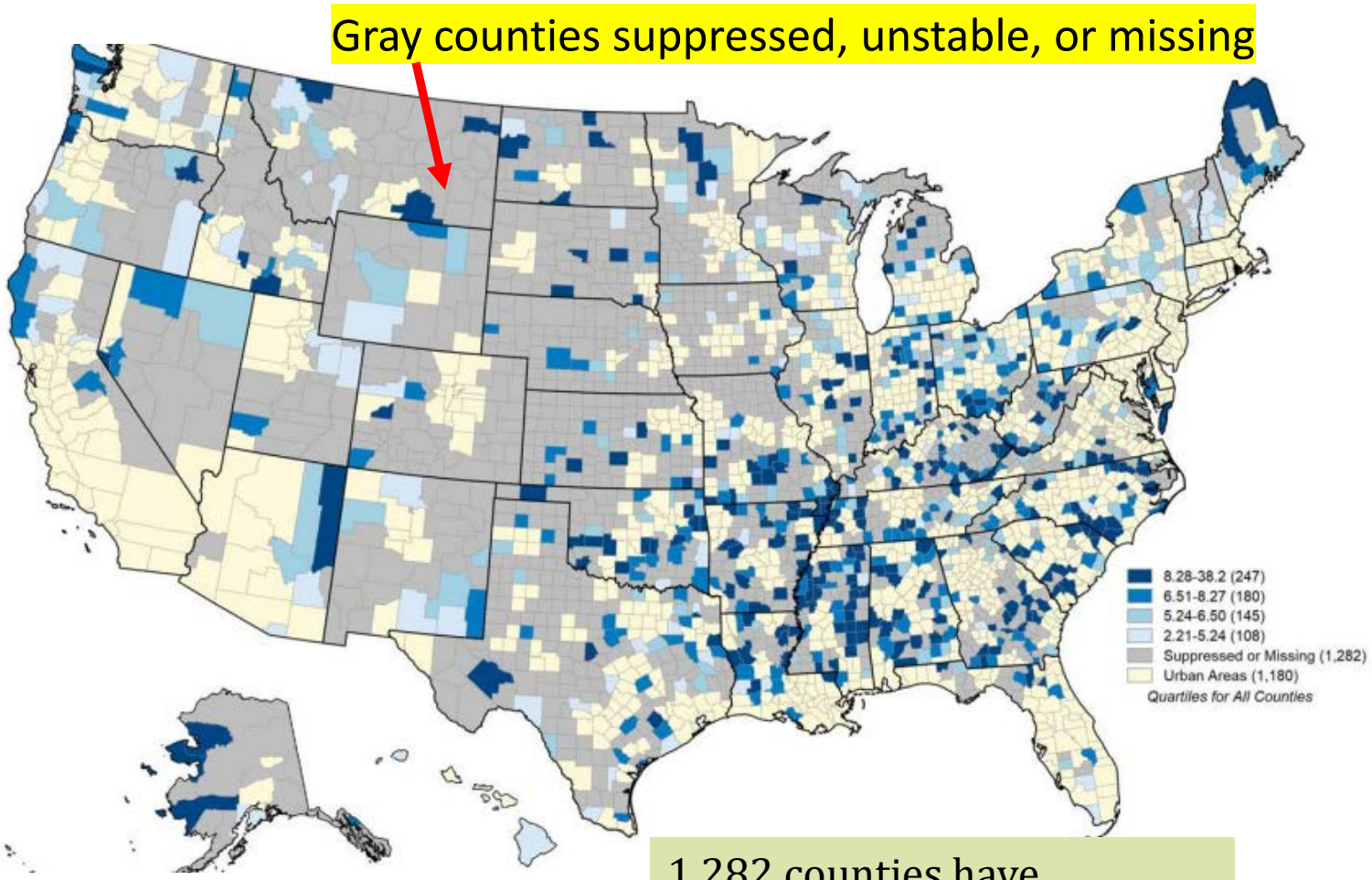
- Even at division level, **data are sometimes unavailable or limited due to low incidence and missing data** among certain groups.





Impact of data suppression and missing data

- **Rural areas have smaller populations** = smaller numbers of births, health conditions/outcomes, deaths, etc.
- Each subdivision creates smaller, potentially more identifiable group.
- **Data suppression** - counties with *<10 incidences potentially identifiable*, so data suppressed and unavailable.
- **Statistically unstable rates** - counties with <20 *incidences*.
- **Missing data**
- **Suppressed, unstable and missing data** were combined on maps.



1,282 counties have suppressed or missing data for 5-year infant mortality

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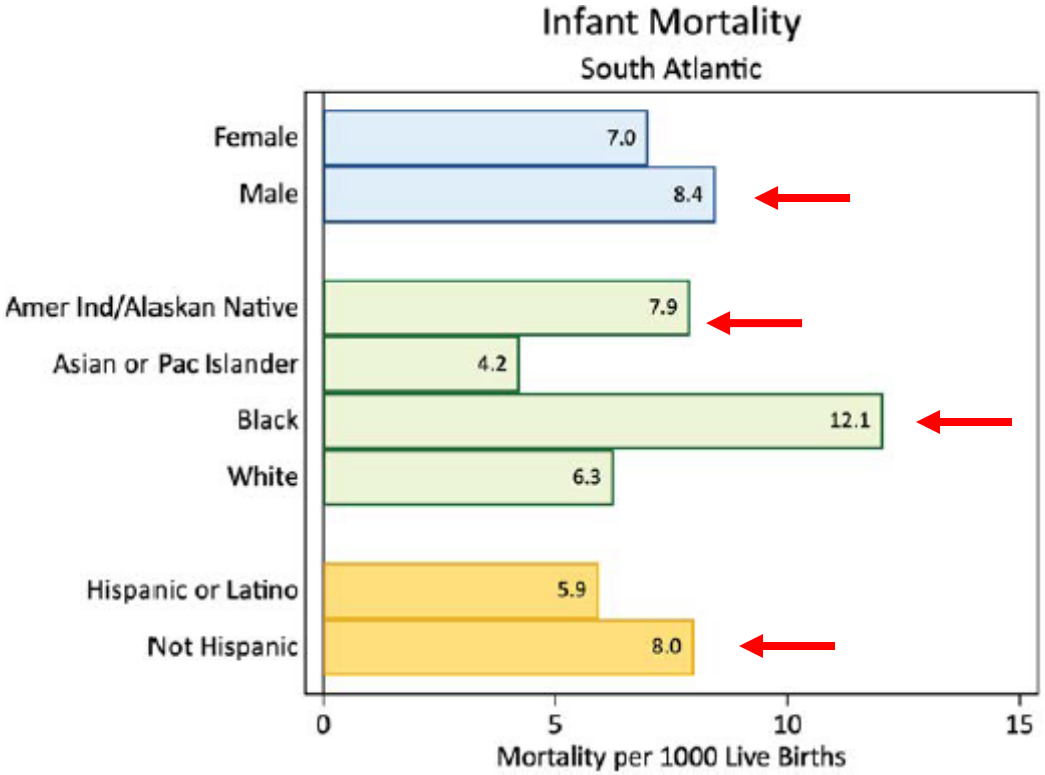
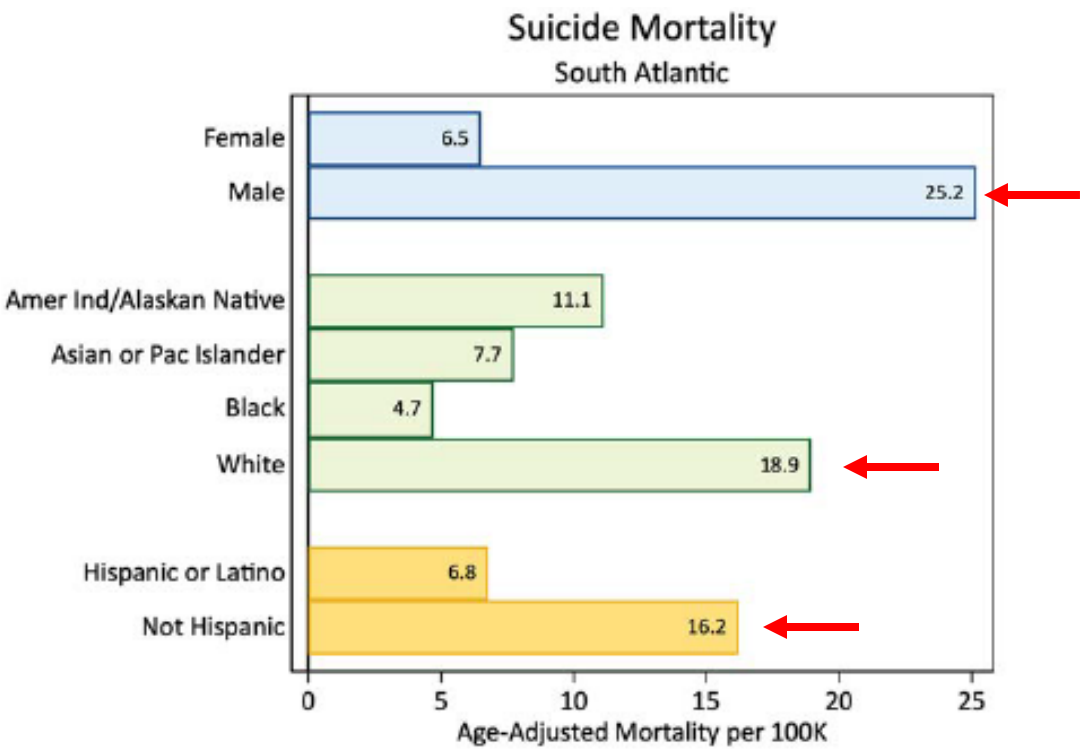
Disparities can be easily seen when there are more data





OMB Race & ethnicity definitions and collection methods

- CDC Compressed Mortality Files https://wonder.cdc.gov/wonder/help/cmf.html#Racial%20Differences
- Office of Management budget standards and definitions for race and ethnicity data. Currently under review for revision. https://www.whitehouse.gov/omb/briefing-room/2023/01/26/initial-proposals-for-revising-the-federal-race-and-ethnicity-standards/
  - **"We encourage everyone to provide your personal thoughts and reactions on these proposals, including how you believe they may affect different communities, by April 12, 2023."**

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National Maps

Rural and urban counties are shown

Look for regional patterns

Are there Issues that cross borders?

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Reading the maps

Urban area – map doesn't show value

National maps

Are there regional patterns for this indicator?

Blues = rural counties with data

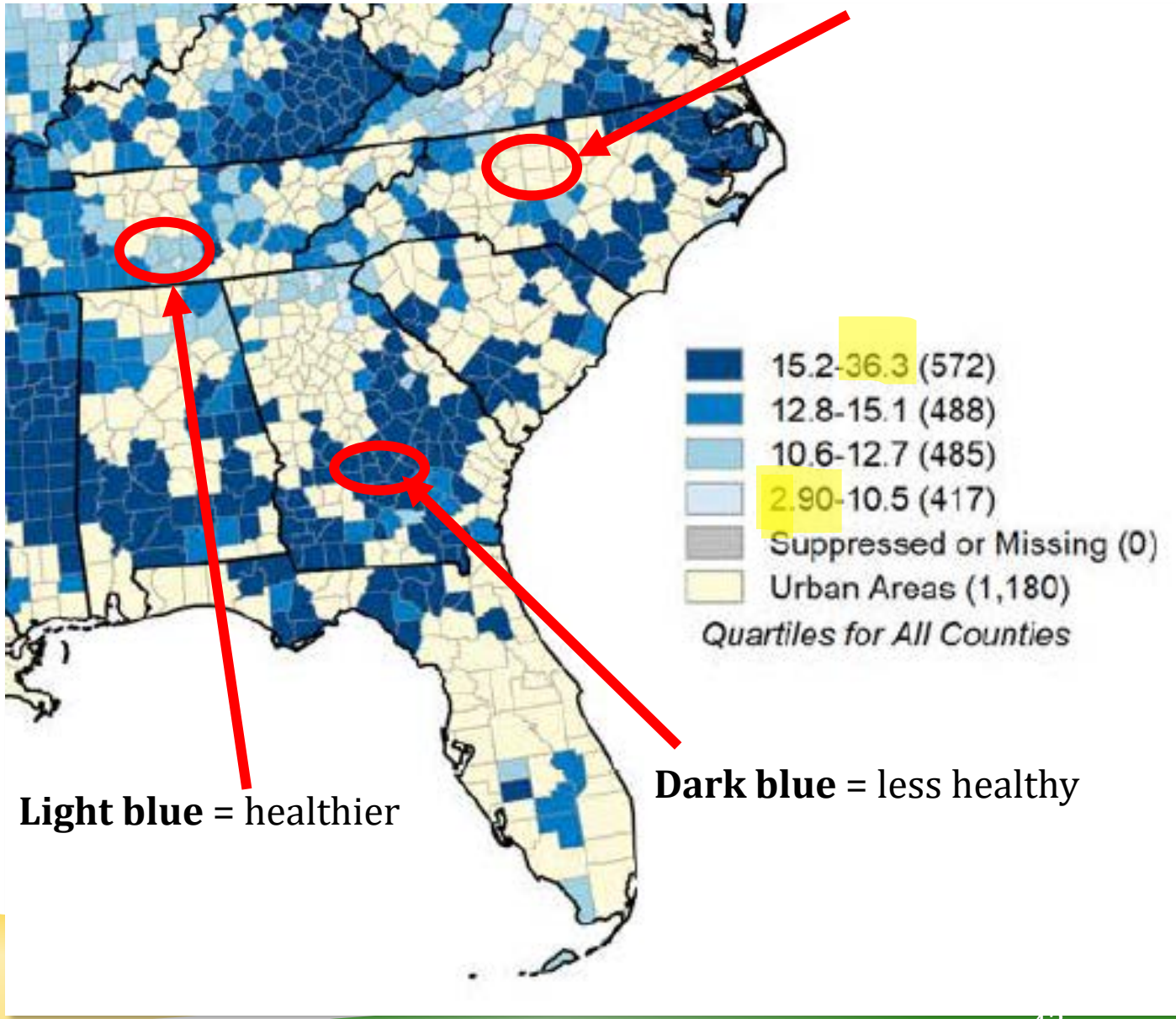
Darker blue represents in the least healthy quartile (less healthy than 75% of U.S. county values)

Lighter blues are more healthy

Yellow counties are urban (no values shown)

Grey counties have suppressed data

U.S. data range in legend - 2.90 - 36.3



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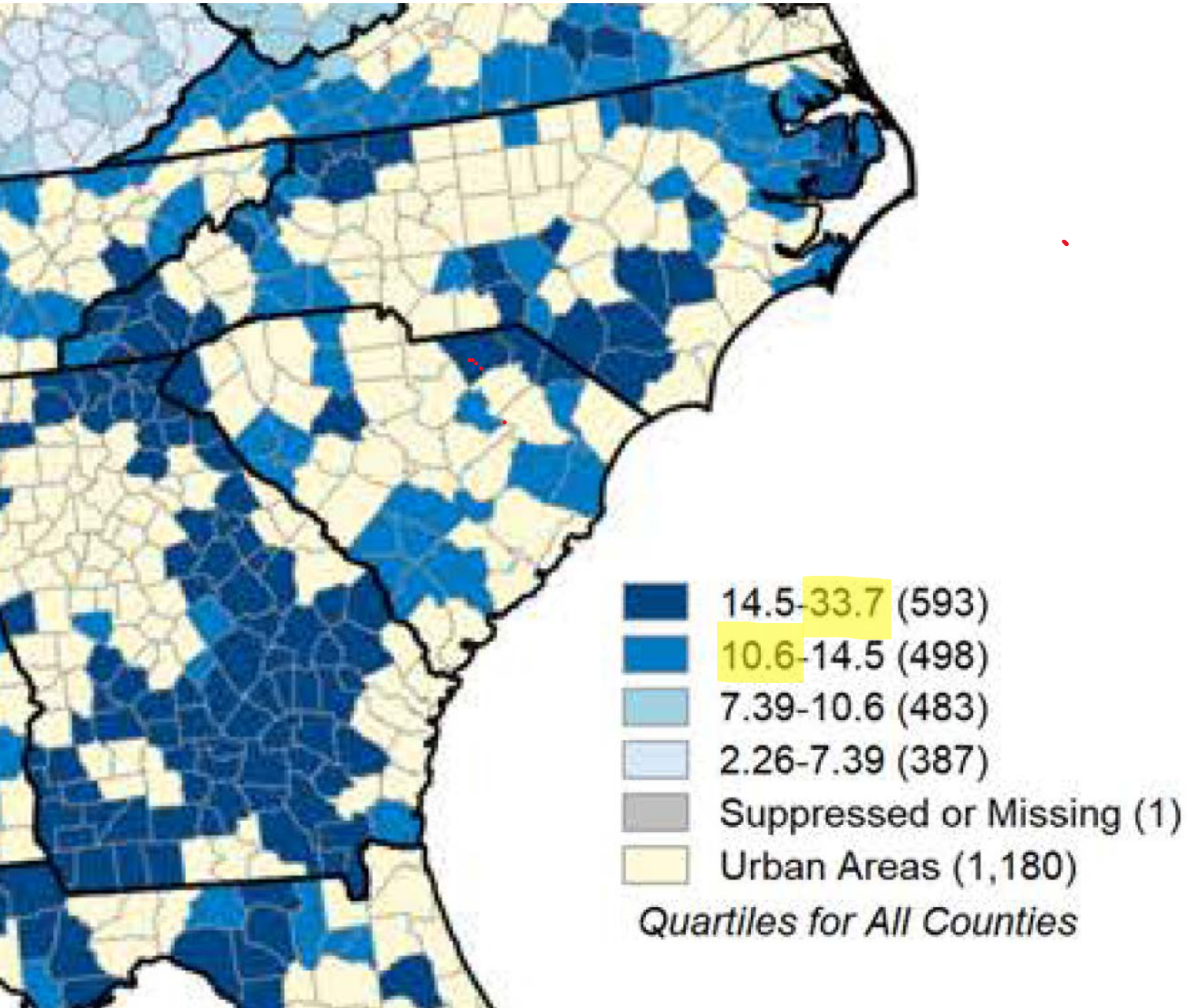
Uninsured population in NC

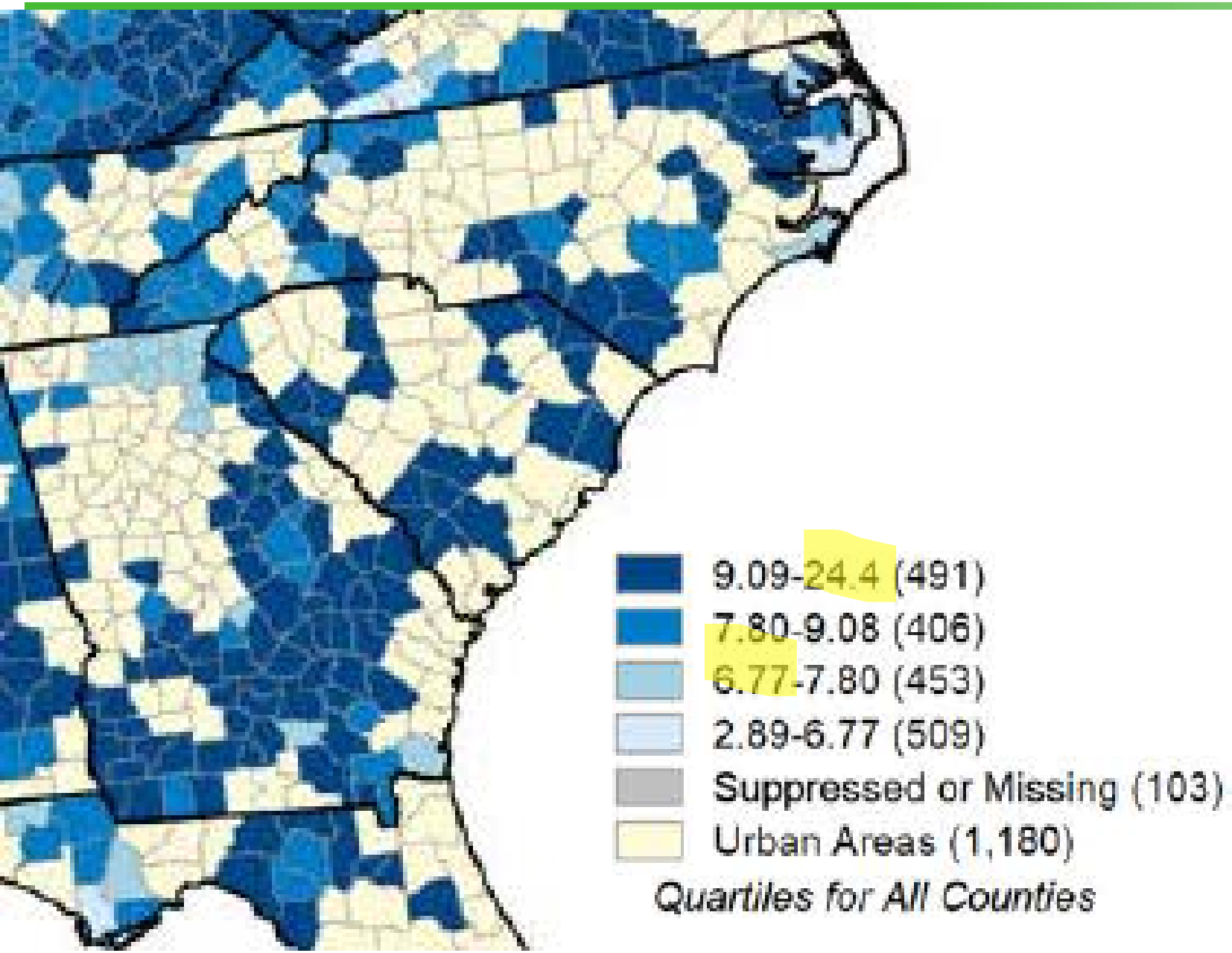


Most NC rural counties are **dark blues.**

Darker counties have highest proportion of population < 65 without health insurance than rest of U.S. counties

Rates cross borders in rural counties. But this is largely a state issue – changing soon with Medicaid expansion passing recently in NC.

Low birth weight in NC



28 rural NC counties in 4th quartile (9.09-13.4% LBW).

16 rural NC counties in 3rd quartile.

5 in Q2

1 in Q1

No missing or suppressed data

Summary

What are the most pressing issues in my state?

Do we have rural-urban health disparities?

How does my state compare to the rest of the country?

Are we part of a regional issue?

Are there differences based on sex, race, and ethnicity in my division?

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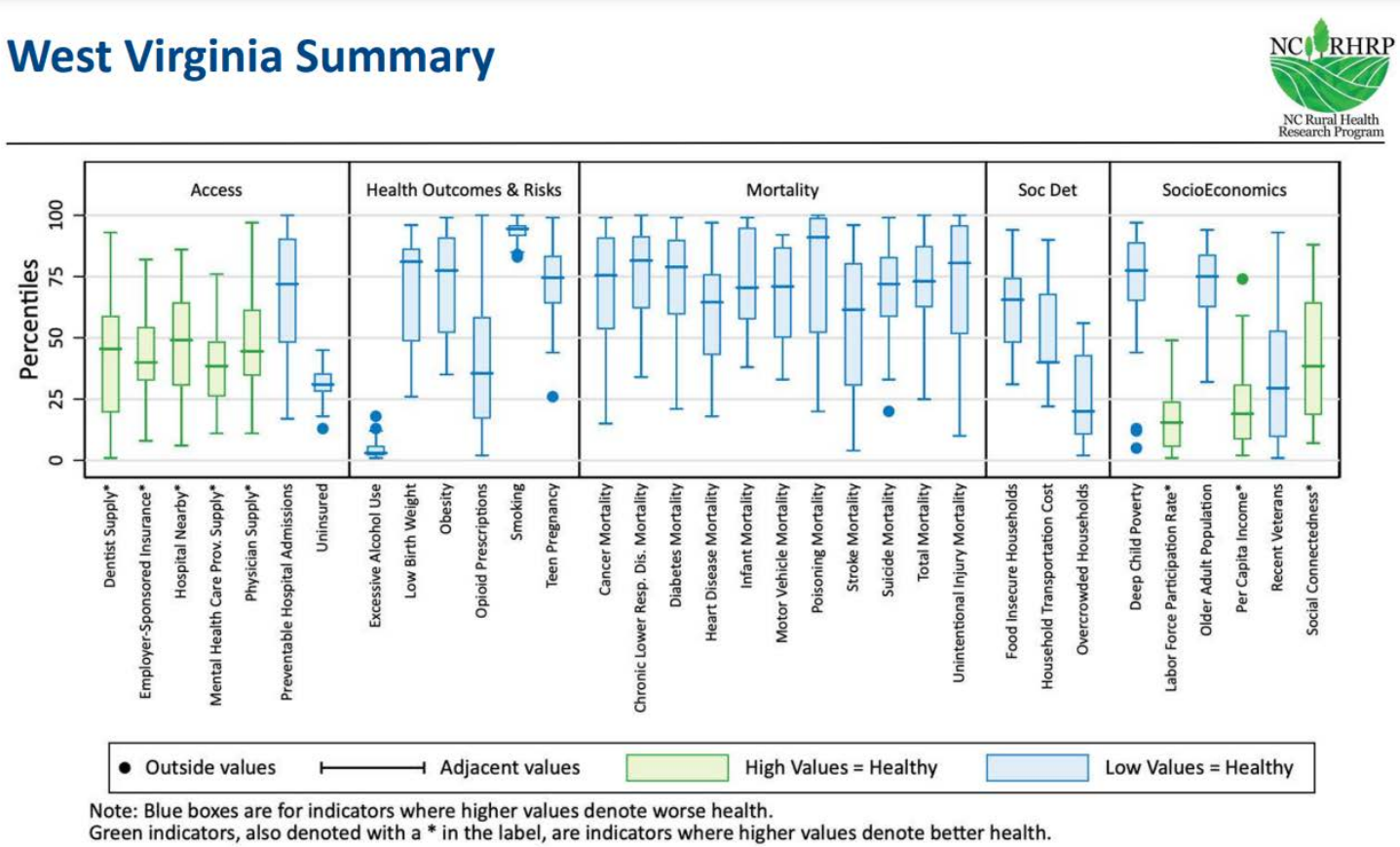
Summary – What are our most pressing issues?



State summary charts – all indicators

- Remember gray horizontal lines are national quartiles –shows you how you rank compared to other counties in U.S.
- Do you have indicators in 25th and 75th percentiles?
- Depending on indicator, having data in upper or lower quartiles means you have some county rates that are among the best or worst nationally.
- Helps identify pressing issues and consider range of state data.

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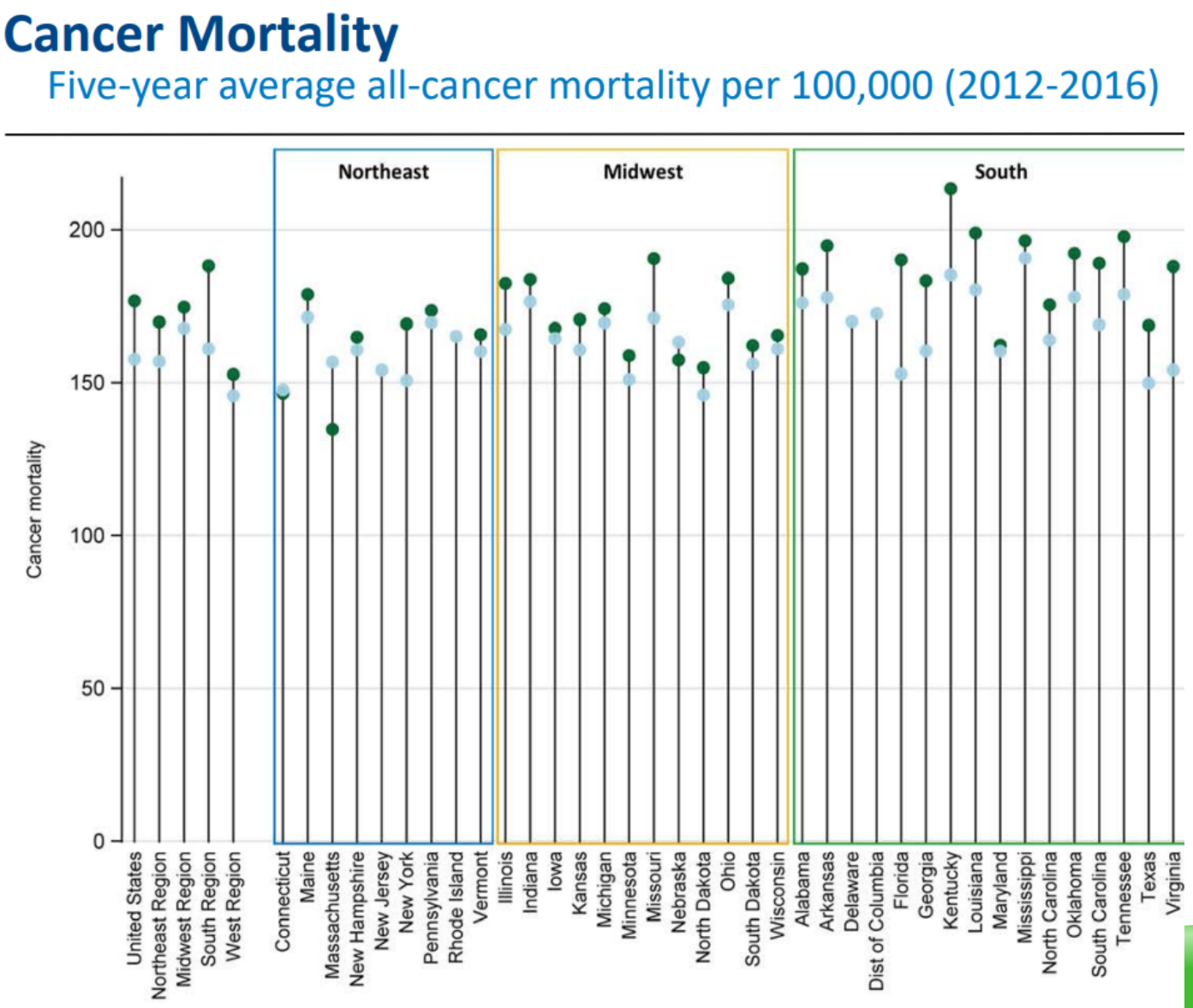
Summary – Do we have a rural-urban disparity?

- Which indicators have the largest disparities in your state?
- How does your state's disparity compare to other states for the indicators? Are you similar to other states in your region?
- How does your rural state average compare to other states?



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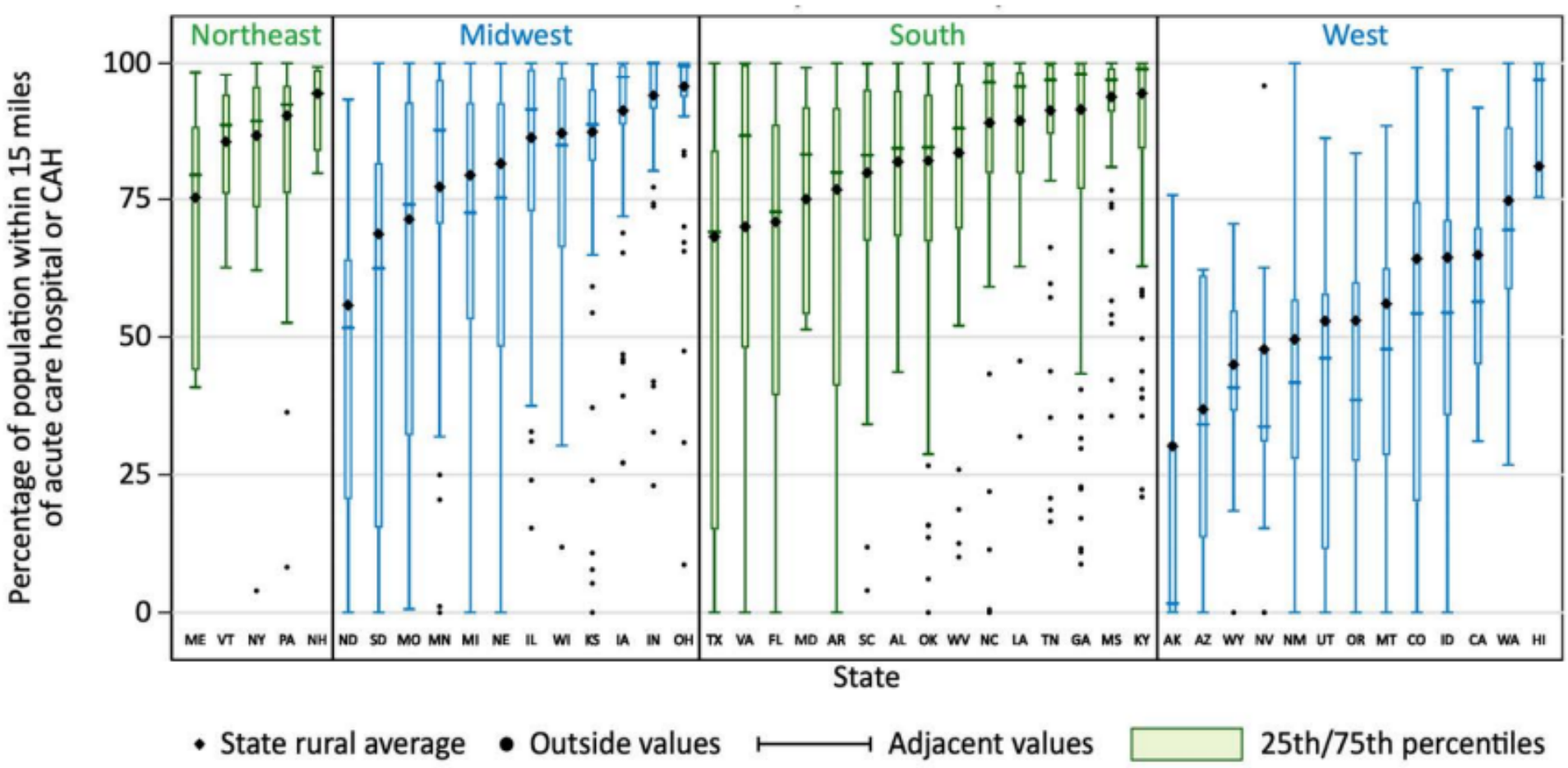
Summary – How does my state's rural data compare to other states?

- How does your rural data compare with other states?
- What does your rural data range look like?
  - Broad or narrow?
  - Centered or skewed?
- Where is the median?



Note: States sorted by rural average within region.

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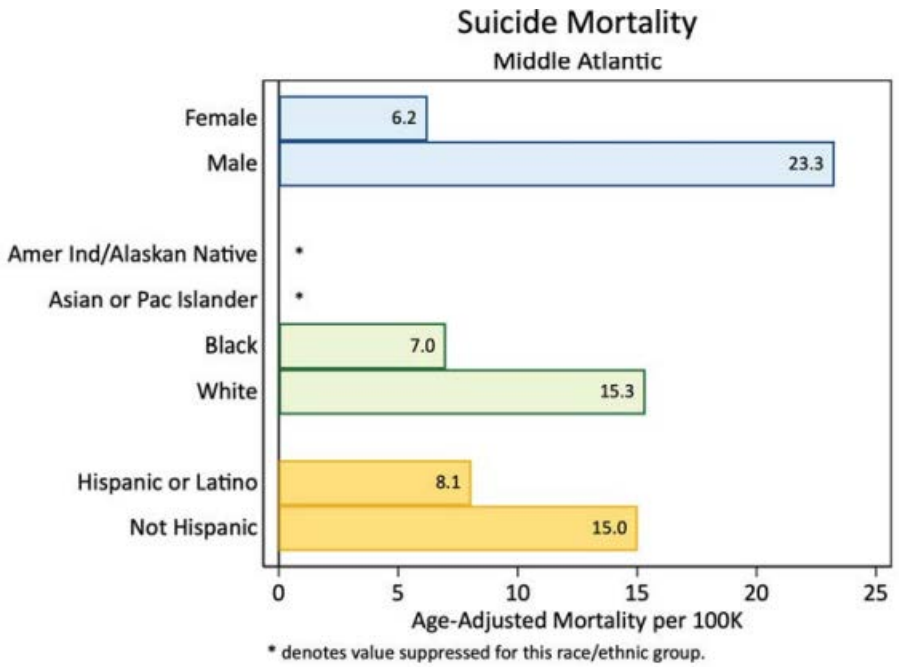
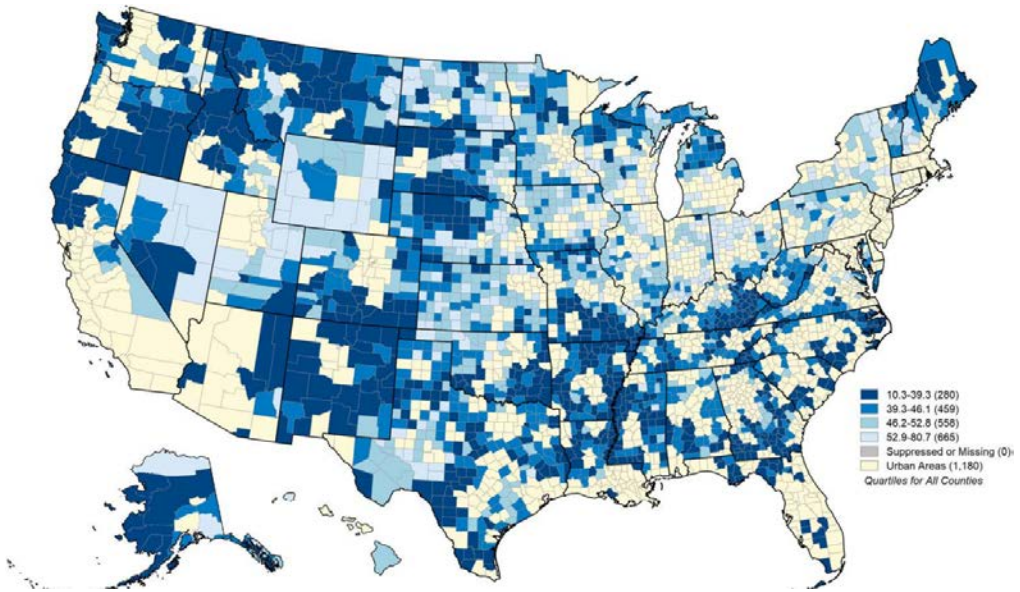
Summary

- Are there sex, race, or ethnicity disparities among the mortality indicators in your Census division?



- Are there geographic patterns among counties in your state?
- Do you share challenges with neighboring states?



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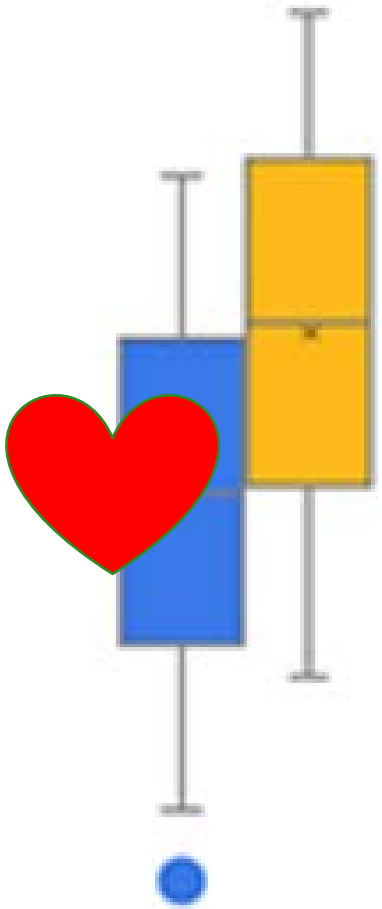
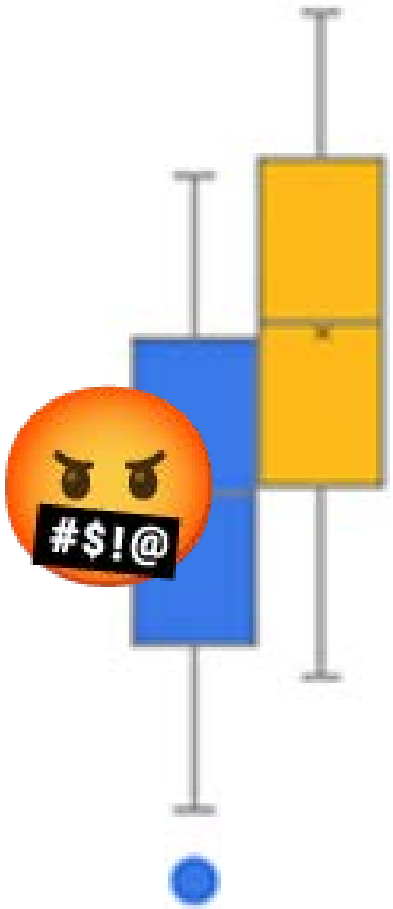
Which kind of person are you?





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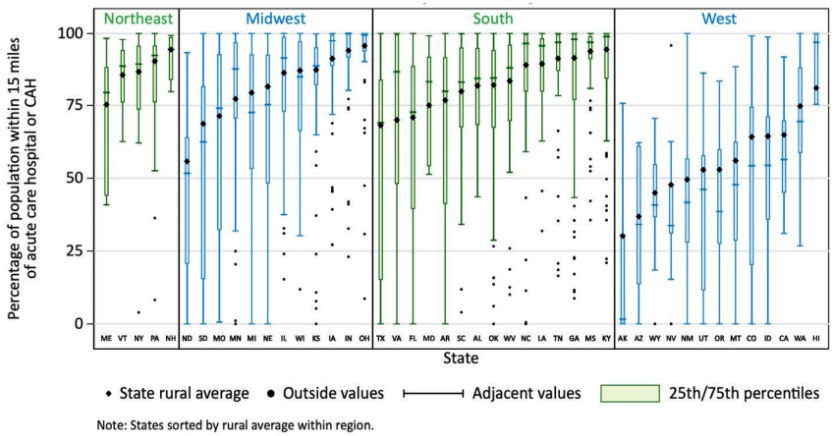
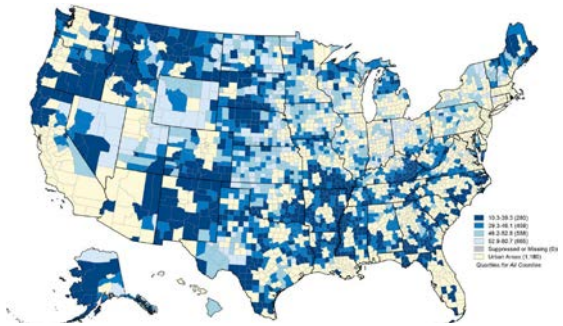
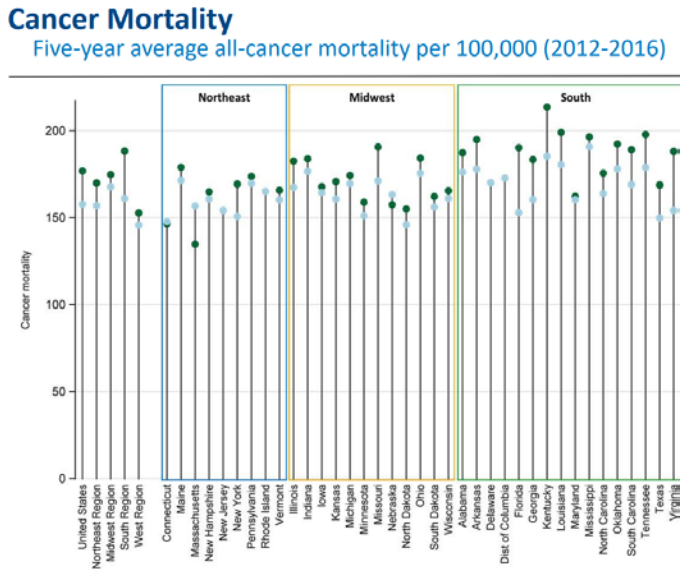
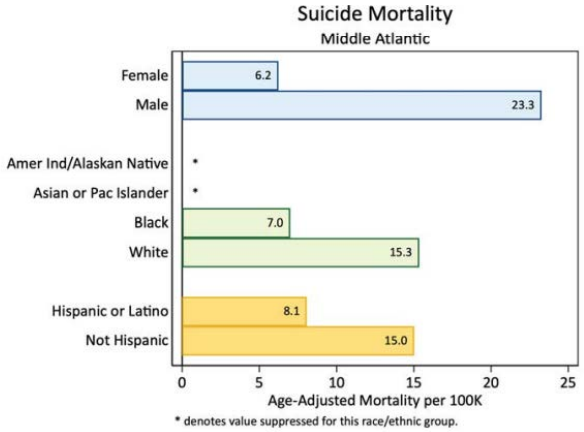
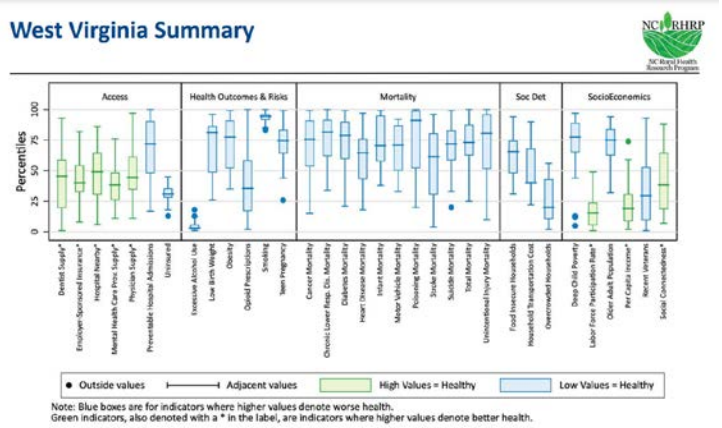


Questions









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References

1. Ahima RS, Lazar MA. The Health Risk of Obesity—Better Metrics Imperative. Science. 2013 Aug 23;341(6148):856-8. Available at: https://www.science.org/doi/10.1126/science.1241244.

2. Centers for Disease Control and Prevention. Body Mass Index: Considerations for Practitioners. 2/8/11. Available at: https://stacks.cdc.gov/view/cdc/25368.

3. Harvard T.H. Chan School of Public Health. Obesity Prevention Source. Ethnic Differences in BMI and Disease Risk. Accessed 10/11/22. Available at: https://www.hsph.harvard.edu/obesity-prevention-source/ethnic-differences-in-bmi-and-disease-risk/#References.

4. Stern C. Why BMI is a Flawed Health Standard, Especially for People of Color. The Washington Post. May 5, 2021. Available at: https://www.washingtonpost.com/lifestyle/wellness/healthy-bmi-obesity-race-/2021/05/04/655390f0-ad0d-11eb-acd3-24b44a57093a_story.html.

5. Stanford FC, Lee M, Hur C. Race, Ethnicity, Sex, and Obesity: Is It Time to Personalize the Scale? Mayo Clin Proc. 2019 Feb;94(2):362-363. Available at: https://www.mayoclinicproceedings.org/article/S0025-6196(18)30807-3/fulltext.

6. Blake KS, Kellerson RL, Simic A. Measuring Overcrowding in Housing. U.S. Department of Housing and Urban Development Office of Policy Development and Research. September 2007. Available at: https://www.census.gov/content/dam/Census/programs-surveys/ahs/publications/Measuring_Overcrowding_in_Hsg.pdf.

7. Moseson H, Fix L, Ragosta S, Forsberg H, Hastings J, Stoeffler A, Lunn MR, Flentje A, Capriotţ MR, Lubensky ME, Obedin-Maliver J. Abortion Experiences and Preferences of Transgender, Nonbinary, and Gender-expansive People in the United States. Am J Obstet Gynecol. 2021 Apr;224(4):376.e1-376.e11. Available at: https://www.ajog.org/article/S0002-9378(20)31126-1/fulltext.

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North Carolina Rural Health Research Program

Location:

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University of North Carolina at Chapel Hill
Website: http://www.shepscenter.unc.edu/programs-projects/rural-health/
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Resources

North Carolina Rural Health Research Program
http://www.shepscenter.unc.edu/programs-projects/rural-health/

Rural Health Research Gateway
www.ruralhealthresearch.org

Rural Health Information Hub (RHIhub)
https://www.ruralhealthinfo.org/

National Rural Health Association
www.ruralhealthweb.org

National Organization of State Offices of Rural Health
www.nosorh.org

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Counties per State

State	Rural	Urban	Total
Alabama	37	30	67
Alaska	26	3	29
Arizona	7	8	15
Arkansas	54	21	75
California	21	37	58
Colorado	47	17	64
Connecticut	1	7	8
Delaware	0	3	3
District of Columbia	0	1	1
Florida	23	44	67
Georgia	85	74	159
Hawaii	3	2	5
Idaho	29	15	44
Illinois	62	40	102
Indiana	47	45	92
Iowa	77	22	99
Kansas	86	19	105
Kentucky	85	35	120
Louisiana	28	36	64
Maine	11	5	16
Maryland	5	19	24
Massachusetts	2	12	14
Michigan	57	26	83
Minnesota	60	27	87
Mississippi	63	19	82
Missouri	80	35	115

State	Rural	Urban	Total
Montana	51	5	56
Nebraska	81	12	93
Nevada	13	4	17
New Hampshire	7	3	10
New Jersey	0	21	21
New Mexico	26	7	33
New York	24	38	62
North Carolina	50	50	100
North Dakota	48	5	53
Ohio	49	39	88
Oklahoma	59	18	77
Oregon	23	13	36
Pennsylvania	30	37	67
Rhode Island	0	5	5
South Carolina	20	26	46
South Dakota	59	7	66
Tennessee	52	43	95
Texas	174	80	254
Utah	19	10	29
Vermont	11	3	14
Virginia	52	81	133
Washington	20	19	39
West Virginia	32	23	55
Wisconsin	45	27	72
Wyoming	21	2	23
Total	**1962**	**1180**	**3142**