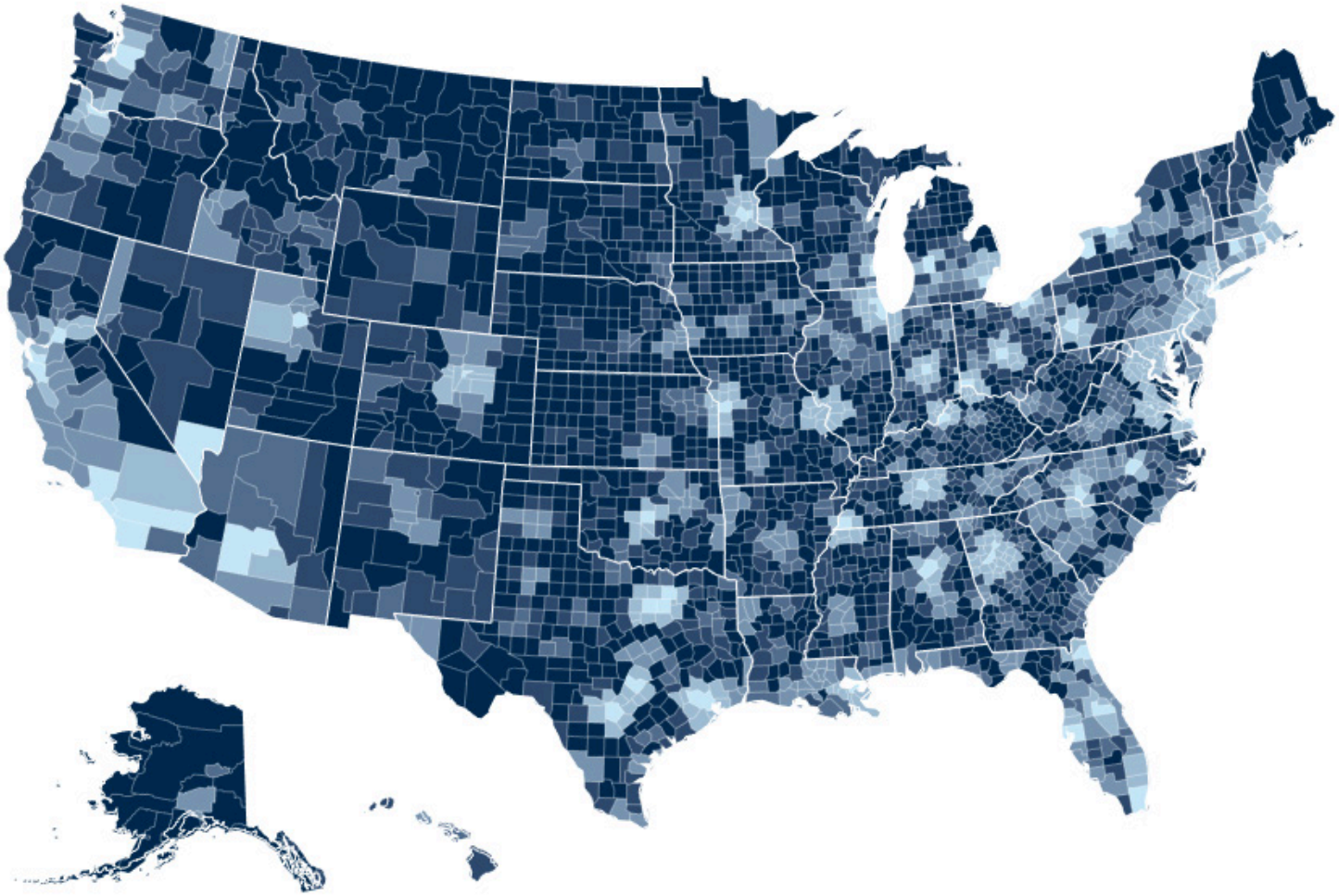
Introduction

This data visualization style guide can be used to create a consistent look and feel for all RHIhub charts and maps. Included are some simple tips around the use of typography and color, chart and map selection, general design principles and data visualization best practices.



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Typography

When creating information graphics, readability along with a clear hierarchy among visual elements is important to enhance understanding and ease-of-navigation for viewers. Type size, style and weight can all be used strategically to help in this regard.

STYLES

Light
Light Italic
Regular
Regular Italic
Semi-Bold
Semi-Bold Italic
Bold
Bold Italic
Extra-Bold
Extra-Bold Italic

CHARACTERS

A B C Ć Č D Đ E F G H I J K L M N O P Q R S Š T U V W X Y
Z Ž a b c č ć d đ e f g h i j k l m n o p q r s š t u v w x y z ž A
Б В Г Ґ Д Ђ Е Ё Є Ж З S И І Ї Й Ј К Л Љ М Н Њ О П Р С Т Ћ
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ю я A B Γ Δ E Z H Θ I K Λ M N Ξ O Π P Σ T Υ Φ X Ψ Ω α β γ
δ ε ζ η θ ι κ λ μ ν ξ ο π ρ σ τ υ φ χ ψ ω ά Ά έ Έ ή Ή ί ϊ ΐ Ί ό
Ό ύ ΰ ϋ Ύ Ÿ Ώ Ă Â Ê Ô Ơ Ư ă â ê ô ơ ư 1 2 3 4 5 6 7 8 9 0 ‘
? ’ “ ! ” (%) [#] { @ } / & < - + ÷ × = > ® © $ € £ ¥ ¢ : ; , . *

	TYPEFACE	SIZE	CASE	COLOR	NOTES
Large Title	Open Sans Semibold	14	All caps	#333333 or RGB (51, 51, 51)	The web application gives wide charts large titles.
Small Title	Open Sans Semibold	12	All caps	#333333 or RGB (51, 51, 51)	
Legend Labels	Open Sans Regular	12	U/LC	#333333 or RGB (51, 51, 51)	
Axis Labels	Open Sans Regular	12	NA	#565656 or RGB (86, 86, 86)	Text is somewhat subordinated (medium gray).
Button Text	Open Sans Bold	12	U/LC	#FFFFFF or RGB (255, 255, 255)	
Tooltip Text	Open Sans Regular	12	U/LC	#333333 or RGB (51, 51, 51)	
Notes and Sources	Open Sans Regular	10	U/LC	#AEAEAE or RGB (174, 174, 174)	Text is subordinated (light gray).

OPEN SANS is a humanist sans serif typeface designed by Steve Matteson, Type Director of Ascender Corp. This version contains the complete 897 character set, which includes the standard ISO Latin 1, Latin CE, Greek and Cyrillic character sets. Open Sans was designed with an upright stress, open forms and a neutral, yet friendly appearance. It was optimized for print, web, and mobile interfaces, and has excellent legibility characteristics in its letterforms.
(from fonts.google.com)

The Rural Health information site currently uses the Verdana typeface. Open Sans is a compatible sans serif font family that also provides good readability at small sizes and has a wider range of type styles (light, semi-bold, etc.) to offer than Verdana.

Open Sans is part of the free-of-charge, open source collection of Google fonts.

Color | neutral palette

There are two primary color palettes for the data visualizations: a neutral “default” palette of blues, and a more colorful palette for racial groups or other breakouts of categorical data. Sequential data (numerical data, or categorical data with a clear order to the categories) should use the “default” palette of blues.

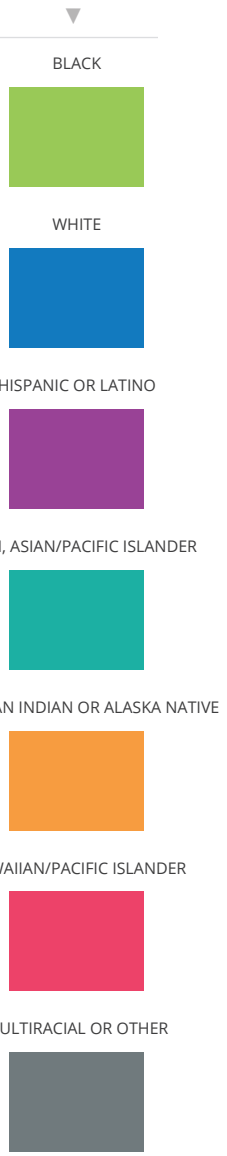
PALETTE NAME	DESCRIPTION	COLORS
default_one	The default dark blue can be used for the simplest charts: bar charts where each bar is labeled, and line charts with only one line.	HEX 1D4E71 RGB (29, 78, 113)
default_two	The binary palette can be used for charts that only require two colors. Charts that assign colors to metro and nonmetro should use this palette.	HEX 80A6C4 RGB (128, 166, 196); HEX 1D4E71 RGB (29, 78, 113)
default_light-dark	Generates a stepped color scale, eg. for a heatmap. Low numbers will be light blue and high numbers will be dark blue. With text data values, the first legend item will be light blue and the last legend item will be dark blue.	HEX C6E7F7 RGB (198, 231, 247) → HEX 022A4D RGB (2, 42, 77)
default_dark-light	Generates a stepped color scale, eg. for a heatmap. Low numbers will be dark blue and high numbers will be light blue. With text data values, the first legend item will be dark blue and the last legend item will be light blue. Dark blue should generally be used for “bad” values, so data where high numbers are bad (eg. disease incidence, poverty) should use default_light-dark, while data where high numbers are good (eg. income) should use default_dark-light. With text data values (categorical data, eg. stacked bar charts), the same principle applies: default_dark-light should be used if the legend items go from bad to good; default_light-dark should be used if the legend items go from good to bad. When there is no good/bad distinction, dark blue can be used for higher numbers. Exception: the Rural Health Data Explorer uses the default_light-dark palette for all data points to avoid confusion when switching between map views.	HEX 022A4D RGB (2, 42, 77) → HEX C6E7F7 RGB (198, 231, 247) HEX 022A4D RGB (2, 42, 77); HEX 1D4E71 RGB (29, 78, 113); HEX 4E7597 RGB (78, 117, 151); HEX 80A6C4 RGB (128, 166, 196); HEX C6E7F7 RGB (198, 231, 247)

EXAMPLE STEPPED COLOR SCALE: THE DEFAULT_DARK-LIGHT PALETTE WITH 5 STOPS. THE WEB APPLICATION GENERATES THE MIDDLE COLORS USING A BLEND FORMULA.

Color | categorical palette

The "race" color palette can be used for racial groups, or other categorical data where the data is not sequential. Additionally, there are stepped race/origin palettes that can be used for color scales of individual racial/origin groups.

PALETTE NAME	COLORS					
race (Colors for racial groups)	HEX F79C40 RGB (247, 156, 64)	HEX 1BAFA4 RGB (27, 175, 164)	HEX 99C957 RGB (153, 201, 87)	HEX EC4368 RGB (236, 67, 104)	HEX 6F7A7E RGB (111, 122, 126)	HEX 127BBF RGB (18, 123, 191)
hispanic (Colors for Hispanic and non-Hispanic)	HEX 984396 RGB (152, 67, 150)	HEX C2C2C2 RGB (194, 194, 194)				
race_scale_black	HEX DBECC5 RGB (219, 236, 197)	HEX BFDD96 RGB (191, 221, 150)	HEX 99C957 RGB (153, 201, 87)	HEX 658932 RGB (101, 137, 50)	HEX 313f1e RGB (48, 64, 31)	
race_scale_white	HEX C4E4F9 RGB (196, 228, 249)	HEX 70B6E3 RGB (112, 182, 227)	HEX 127BBF RGB (18, 123, 191)	HEX 044E7F RGB (4, 78, 127)	HEX 012943 RGB (1, 41, 67)	
origin_scale_hispanic	HEX E9CAE9 RGB (233, 202, 233)	HEX CF91CD RGB (207, 145, 205)	HEX 984396 RGB (152, 67, 150)	HEX 682066 RGB (104, 32, 102)	HEX 440D43 RGB (68, 13, 67)	
race_scale_asian	HEX B4EBE7 RGB (180, 235, 231)	HEX 7BD4CD RGB (123, 212, 205)	HEX 1BAFA4 RGB (27, 175, 164)	HEX 0F7C74 RGB (15, 124, 116)	HEX 014B46 RGB (1, 75, 70)	
race_scale_aian	HEX FFE7D0 RGB (255, 231, 208)	HEX F9C896 RGB (249, 200, 150)	HEX F79C40 RGB (247, 156, 64)	HEX AE5B07 RGB (174, 91, 7)	HEX 562E06 RGB (86, 46, 6)	



HOW COLORS GET ASSIGNED

The web application assigns the palette colors to the data categories sequentially: the first color in the palette will be assigned to the first data category, the second color to the second data category, etc. Data categories are ordered alphabetically by default, although a custom order can be specified.

The "race" palette assumes the data contains all six racial groups. This means that colors may not be assigned to the correct racial group if a racial group is absent from the data - there is no rule ensuring that a racial group always gets a certain color. For this reason, the race4 color palette exists for charts where the racial groups present are American Indian or Alaska Native, Asian, Black, and White. Other custom race palettes can be created in this fashion as needed.

SENSITIVITY WITH COLOR

Care needs to be taken when selecting colors denoting race, ethnicity, or gender - making sure that hues related to specific skin tones or historical references to male/female (blue/pink) are generally avoided to prevent underscoring any related stereotypes.

Color | miscellaneous

Some charts might have different data requiring new colors. The web application allows you to assign colors on an individual chart basis, or create new palettes for future use. Maintaining consistency across all charts (on the RHIhub site and in other RHIhub materials) will ensure RHIhub visualizations have a unified look and feel.

PALETTE NAME	DESCRIPTION	COLORS
male_female	The male/female palette should be used for showing a male/female ratio, with the min and max set so that the middle gray color represents an even ratio (1:1).	FEMALE … MALE HEX 2E91A4 RGB (46, 145, 164) HEX 87BAC3 RGB (135, 186, 195) HEX E0E2E3 RGB (224, 226, 227) HEX B8AEB0 RGB (184, 174, 176) HEX 90797C RGB (144, 121, 124)

SPECIFYING NEW COLORS

It is possible to specify colors outside the pre-defined color palettes in the web application. Care should be taken so that any new color selections are distinctly individual while remaining compatible with the existing palette.

You can specify lists of color in hexadecimal or RGB format, e.g., "#ff0000,#00ff00,#0000ff" or "rgb (0,255,255), rgb (255,0,255)" when embedding charts. A web developer can also add pre-defined color palettes through a simple modification of the primary application JavaScript file.

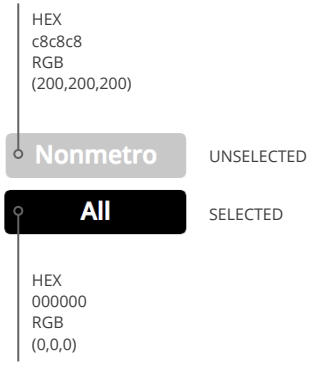
TYPE

Type uses the following three shades of gray, prioritizing titles and labels, while subordinating notes and sources.

- HEX 333333 RGB (51, 51, 51) — TITLES AND LEGEND LABELS
- HEX 565656 RGB (86, 86, 86) — AXIS LABELS
- HEX AEAEAE RGB (174, 174, 174) — NOTES AND SOURCES

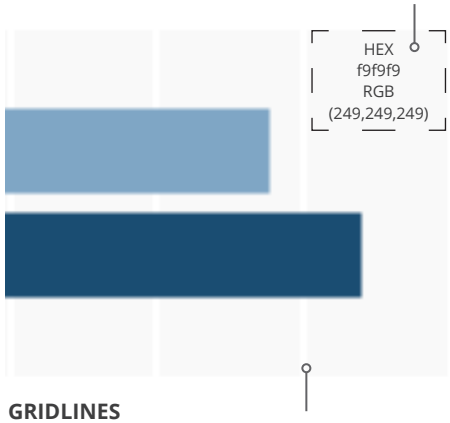
BUTTONS

Gray is used to subordinate unselected buttons while still leaving the type readable. Black indicates a selected state.



BACKGROUND

Chart backgrounds are light gray to allow contrast with chart elements.

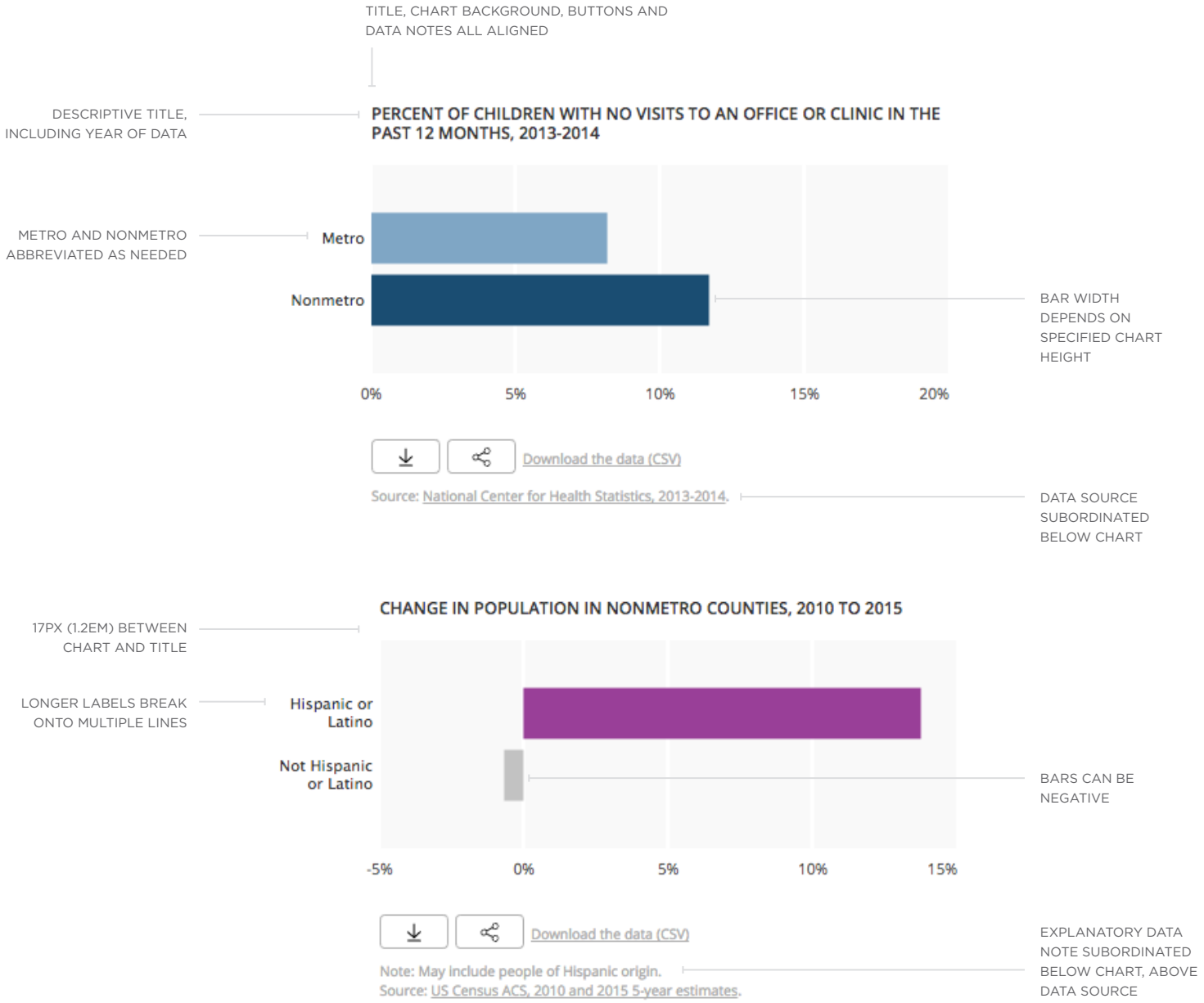


GRIDLINES

Chart gridlines are white, 3px wide.

Bar Charts | simple

Use bar charts to show comparisons, for example, between metro and nonmetro rates.



SIMPLE BAR EXAMPLES

Bar charts are the clearest way to compare the magnitude of different data values.

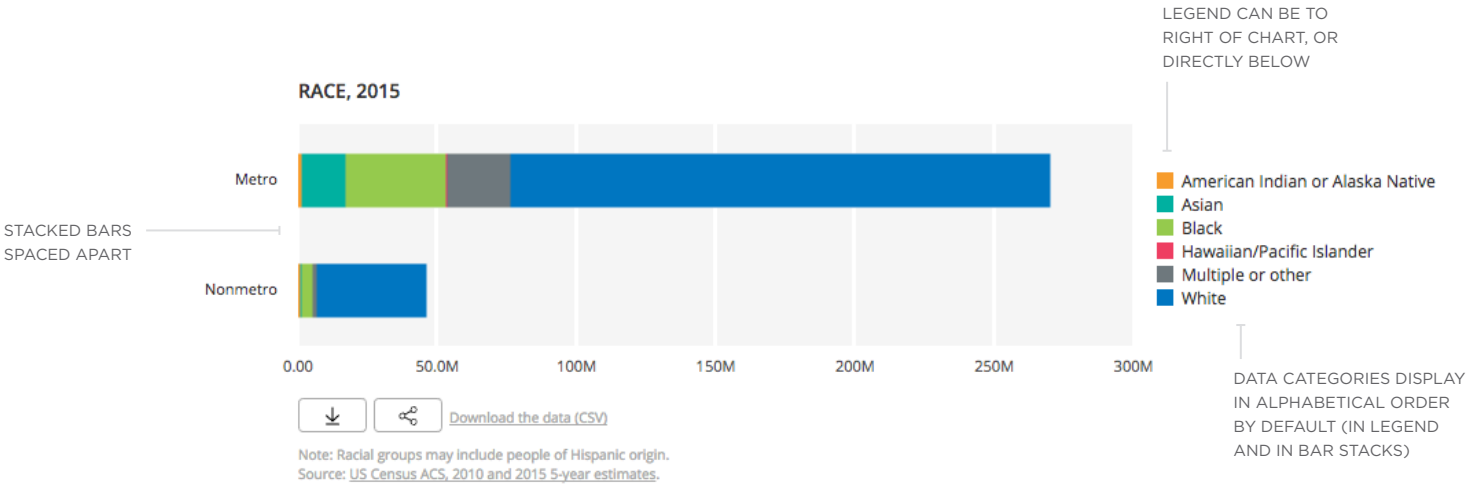
Simple bar charts like these examples show a single breakout of the data (eg., breaking data out by racial group, or by metro/nonmetro status).

It is also possible to stack or group bars, as mentioned on the next pages.

Bar charts can show total counts, percentages, or other rates such as a rate per 100,000. In the web application, you can specify the specific column that should be used, or specify two columns if you are calculating a rate (eg. racial group population and total population).

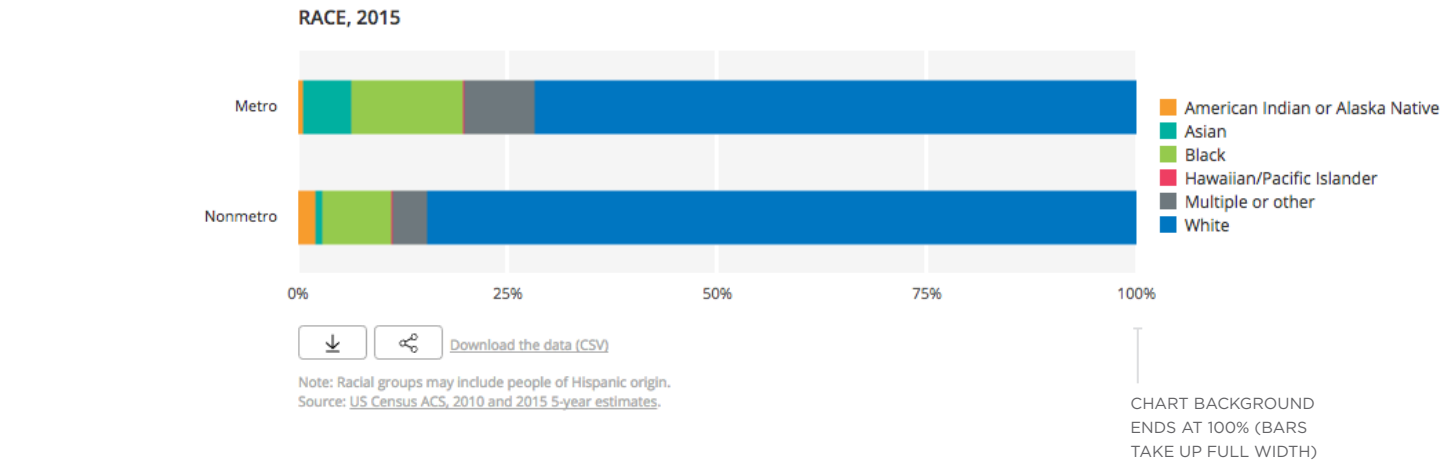
Bar Charts | stacked

Stack bars in order to show parts of a whole, while also showing the total.



STACKED BAR EXAMPLE 1

Stacking racial group populations for metro and nonmetro will show the proportional population for each racial group, while also showing the total metro and nonmetro populations.



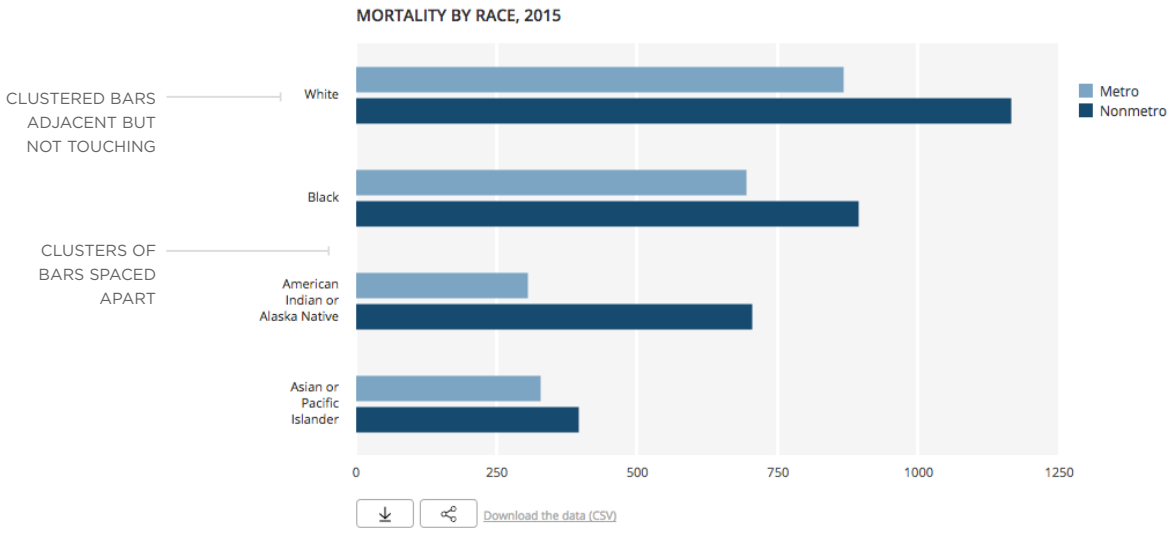
STACKED BAR EXAMPLE 2

Stacking population percentages (rather than population counts) will show parts of a whole with an emphasis on the relative proportions, like a pie chart. This allows for easy comparison of proportions for metro and nonmetro, or other data categories.

In the web application, 100% stacked bar charts are created by stacking percentages, or using a numerator and denominator to calculate a percentage.

Bar Charts | clustered

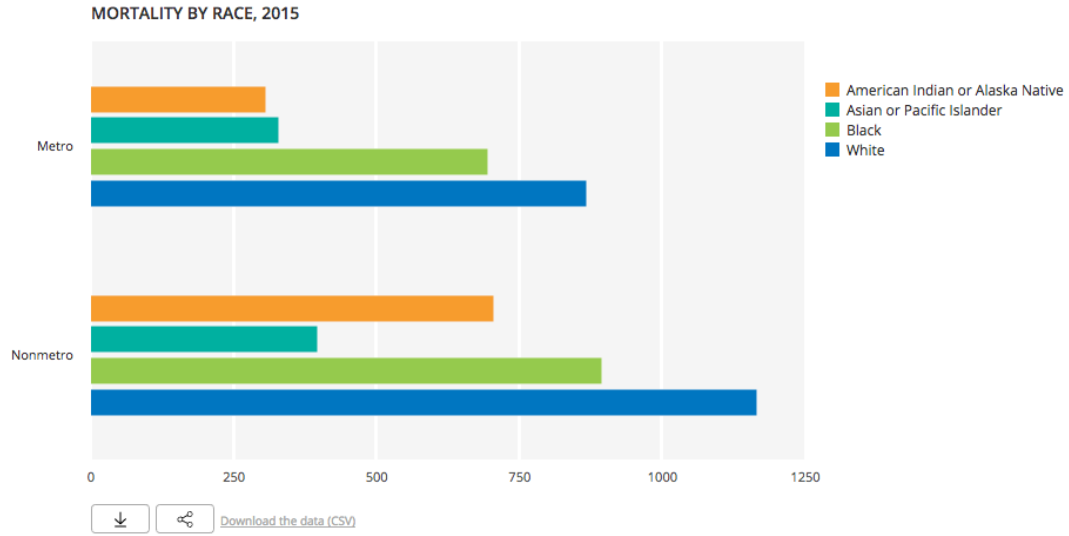
Cluster bars to show comparisons within different data categories.



CLUSTERED BAR EXAMPLE 1

Breaking out metro and nonmetro for each racial group places the focus on the metro/nonmetro disparities (the adjacent bars), while also comparing racial groups.

Ordering the clusters greatest to least communicates the ranking in an intuitive way. In the embed code, the groupValues attribute can be used to specify a custom order for the clusters.



CLUSTERED BAR EXAMPLE 2

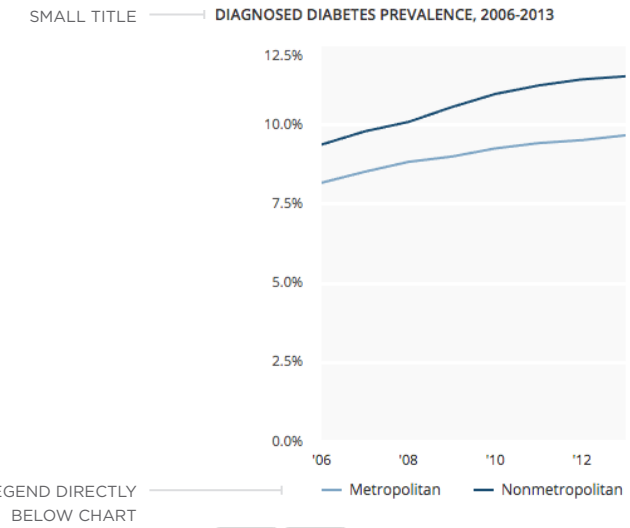
Breaking out racial groups for metro and nonmetro places the focus on the disparities between racial groups (the adjacent bars), while also comparing metro and nonmetro.

Different clusterings of the same data might also lend themselves to different color palettes, as in these examples.

Line Charts

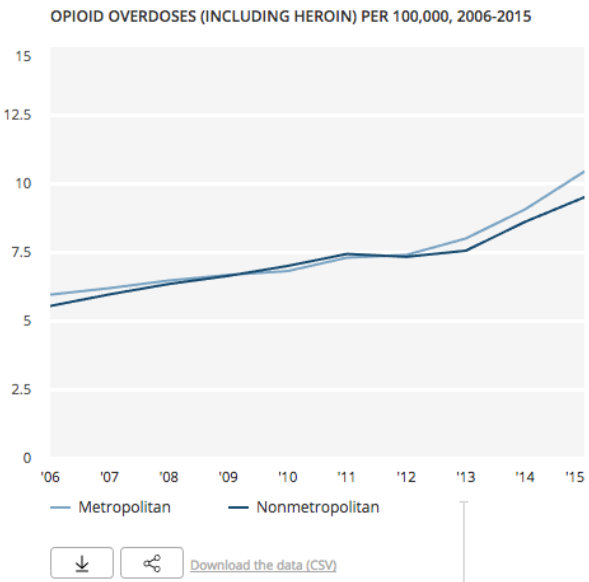
Use line charts to show comparisons and changes over time.

SMALL TITLE



LEGEND DIRECTLY BELOW CHART

FOR NARROWER CHARTS, THE TITLES, BUTTONS, AND DATA NOTES ARE ALIGNED TO THE LEFT OF THE CHART CONTAINER (NOT THE CHART BACKGROUND)



YEARS CAN BE ABBREVIATED TO AVOID CROWDING

LINE CHART EXAMPLES

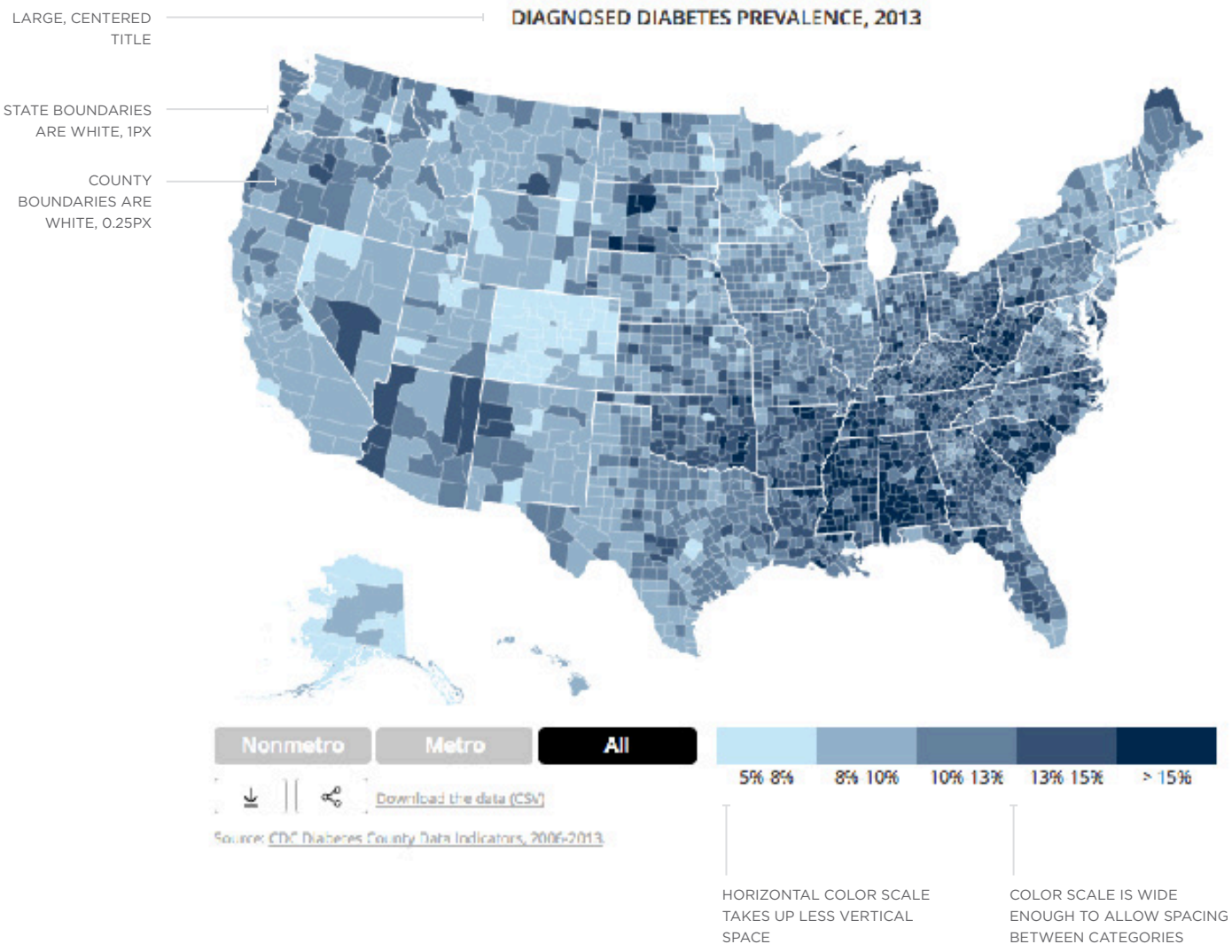
Line charts show trends over time.

In the web application, you can use the groupBy attribute to specify a single breakout of the data (eg., break out by racial group) although the second groupBy value must be the year column. For example, the below chart has a groupBy value of “metro_nonmetro,year”.

The height and width of line charts affect how steep or gradual the lines display, and should be chosen carefully as mentioned below.

Maps

Use heatmaps to show geographic variation in a single data point. Multiple maps side by side can also be used to show comparison between different years of the same data point, or comparison between different data points.



MAP EXAMPLE

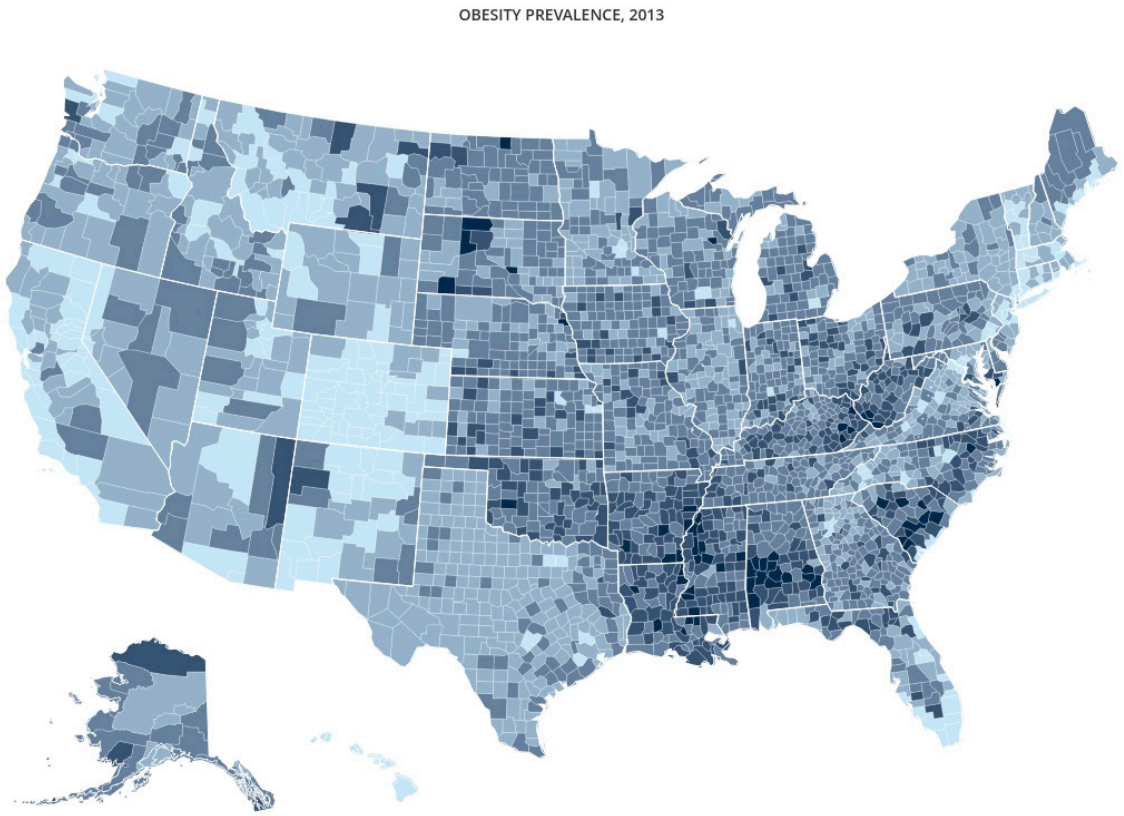
Maps show geographic variation. Heatmaps (choropleths) use color scales to show geographic variation of a numerical data point, or categorical data with a clear order.

The number of color stops (steps in the color scale) should be enough to show geographic variation, while still making it possible to differentiate between the different colors on the map. 5 color stops usually works well, more than 6 become difficult to differentiate.

The Albers Projection moves and resizes Alaska and Hawaii in order to show all states in close proximity.

Chart Images

Static and interactive charts can use similar styles with a few small differences.



UNDERLINE IS REMOVED FROM SOURCE HYPERLINK

Source: CDC Diabetes County Data Indicators, 2006-2013.

RHIhub Rural Health Information Hub

BUTTONS ARE REMOVED AND BRANDING IS ADDED BELOW SOURCE

STATIC IMAGE CHARTS

Charts made available as static images - either in print materials, slide decks, or on the website as images available for download - can use the same overall styles as the interactive charts, in order to maintain a consistent look and feel.

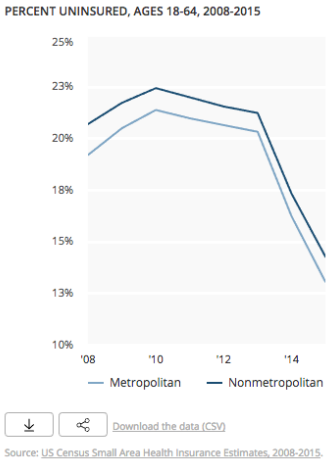
For static charts, the RHIhub branding is added, buttons are removed, and the underline is removed from the source text. Sizing can also be adjusted as desired.

In the embed code, setting the "screenshot" attribute to "true" will result in these style changes (for use when taking screenshots to use as a chart image).

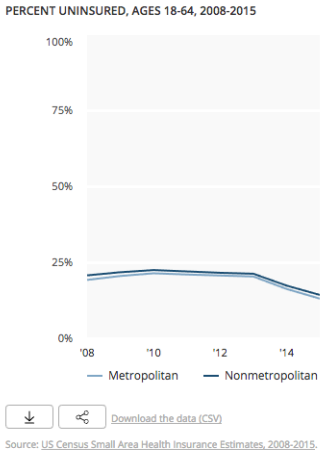
Best Practices | axes and color scales

To ensure a fair presentation of your data, use care when choosing the min and max for chart axes and map color scales - avoid exaggerating or hiding variation within your data. This inherently requires some subjective judgment.

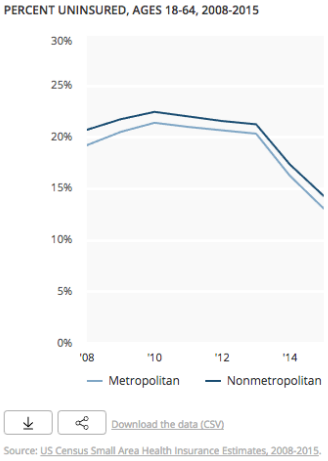
MIN AND MAX EXAGGERATE THE TREND



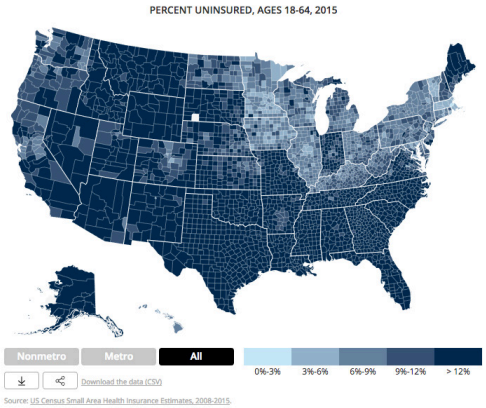
MIN AND MAX HIDE THE TREND



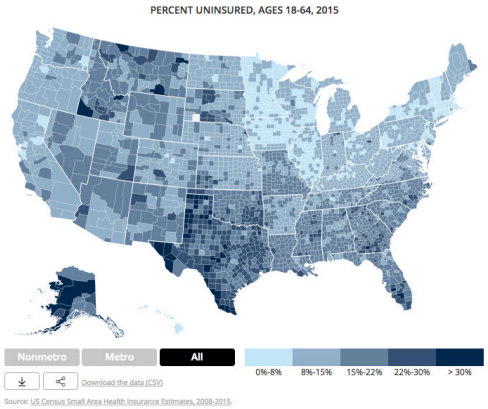
MIN AND MAX SHOW THE TREND FAIRLY



MIN AND MAX HIDE GEOGRAPHIC VARIATION



MIN AND MAX SHOW FULL RANGE OF VARIATION



AXES AND COLOR SCALES

The min and max chosen should not exaggerate a small variation in the data, or hide a large variation in the data - based on your subjective understanding of what constitutes a small or large variation for that dataset. This applies to bar and line chart axes, and to map color scales.

The minimum should often be zero, although starting above zero might be appropriate in some cases. The maximum should often be near the max data value, although could be significantly higher to allow for comparability with an adjacent chart.

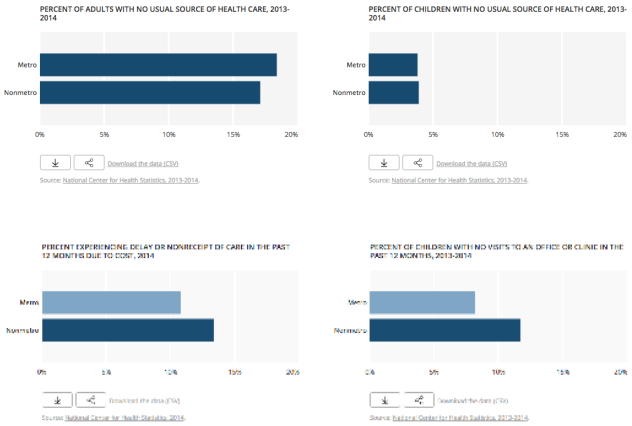
Choosing the height and width of your chart carries similar risks - skinny or wide charts can exaggerate or hide trends.

In the embed code, the “yMax” attribute specifies the maximum for bar chart and line chart axes, and for map color scales. When a maximum is not specified in the chart embed code, the application chooses one automatically based on the largest data value.

Best Practices | consistency

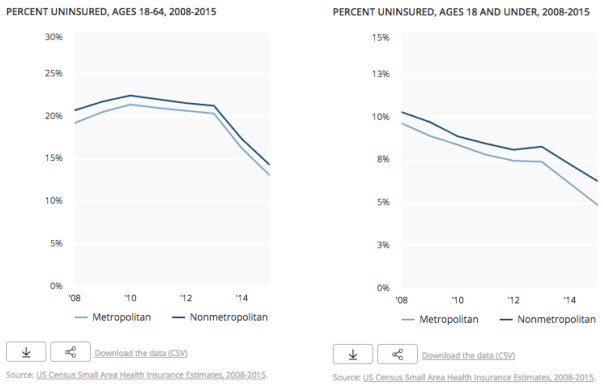
When you have multiple charts on a page, being consistent with axes and color will reduce the risk of confusion and make it easier for users to quickly grasp meaning.

INCONSISTENT COLOR CREATES CONFUSION

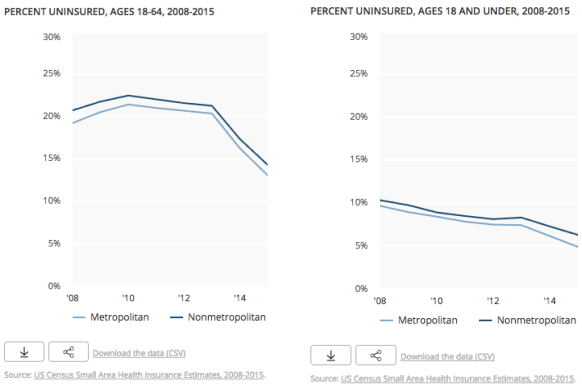


CONSISTENT COLOR MAKES INTERPRETATION EASY

DIFFERENT AXES MAKE COMPARISON BETWEEN CHARTS DIFFICULT



CONSISTENT AXES ALLOW EASY COMPARISON BETWEEN CHARTS



CONSISTENT COLOR

Charts should use color palettes in a consistent manner - if one chart uses light blue and dark blue for metro and nonmetro, the other charts on the page should as well.

Similarly, using the same color palette for different data categories on charts in close proximity can cause confusion.

CONSISTENT AXES

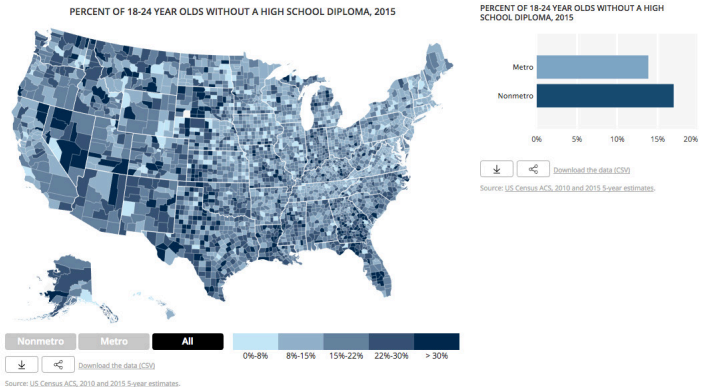
Placing charts adjacent to one another will invite comparison. Charts should generally use the same min and max if you want the user to compare them to each other, although this depends on the data being compared.

With charts on the state pages, there is a tradeoff: using the same min and max across all states ensures that charts from different states are easily comparable without chance of confusion, but can make variation within each state less apparent.

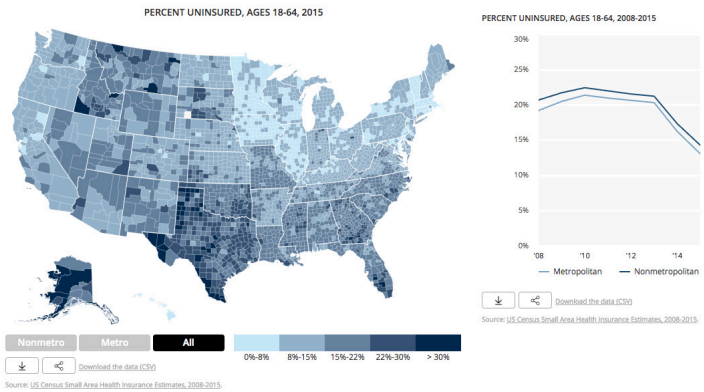
Best Practices | chart combinations

Placing charts adjacent to one another can be an effective way to add summary information or reveal other data stories.

MAP + BAR CHART SHOWS GEOGRAPHIC VARIATION AND OVERALL DIFFERENCES



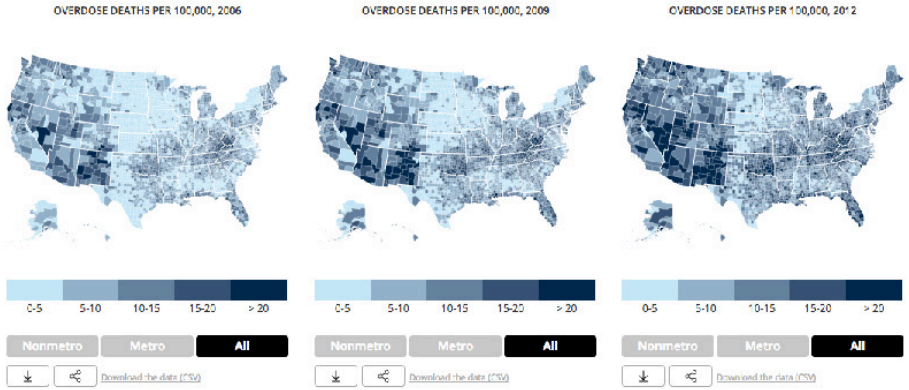
MAP + LINE CHART SHOWS GEOGRAPHIC VARIATION AND TREND OVER TIME



USING MAPS WITH OTHER CHARTS

Maps are good at showing geographic variation, but not overall metro/nonmetro differences or trends over time. Using a map with an adjacent bar or line chart can provide useful context: a map and a metro/nonmetro bar chart shows geographic variation and the overall metro/nonmetro difference, which is difficult to read from the map alone. Similarly, a map and a line chart shows geographic variation and the overall trend over time.

SMALL MULTIPLES OF A CHART REVEAL ADDITIONAL INFORMATION



SMALL MULTIPLES

One technique for showing comparisons is “small multiples” - repeating the same type of chart to facilitate easy comparison, such as showing several bar charts, where the only difference is the data category displayed, or several maps, where the only difference is the year displayed.