Top Tips for Making Beautiful, Informative Maps

Sharon Murphy, MS
Public Health GIS Analyst

Cartography Webinar

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Topics Covered In This Webinar

1. Introduction to Cartography
   What is cartography?

2. Tips For Creating Good Maps
   Simple design strategies

3. Common Mistakes
   And their solutions
Introduction to Cartography
What is Cartography

- Cartography is the *art* of telling a story with a map.
- The *art* of telling a story with a map is accomplished through a combination of many elements, including color, layout, theme, font, and symbolization.

Map Credit: Northernhealth.ca
Why Cartography Matters

- Enhances communication of spatial data
- Clarifies the story contained in the data so we can deliver our story in a clear and concise manner.
- Design impacts how the map is read and interpreted.
- Presents an opportunity to visually engage your audience.
- Good map design will both answer a question, and prompt further questions.

Good design is clear thinking made visible ~ Edward Tufte
The Audience Informs Map Design

- **Public Health Professionals**
  - Can handle technical and complex information.
  - Can be very detailed.
The Audience Informs Map Design

- **Policy Makers**
  - Be concise

These maps were featured in the American Diabetes Association policy briefs, 2016, as part of their annual Arizona Diabetes Day at the Capitol.
The Audience Informs Map Design

- General Public
  - Simplify the content.
  - Be very explicit and explanatory.
  - Fewer details.
Color

- Color can have cultural significance
- Standard **green** and **red** combinations are hard for people with color-blindness to distinguish from one another.

- People with low vision will have a hard time distinguishing between colors with **low contrast**.
- Connect color to the feature in a way that meets common convention; **water**, **vegetation**, **Alarm**
You don’t have to use color. Gray scale can be very effective as a background.
Pre-attentive Visual Processing

We assign quantitative meaning to some attributes pre-attentively, even though they have no explicit value attached to them.

- **Length**: longer = greater
- **2D Position**: Higher and farther to the right = greater
- **Width**: wider = greater
- **Size**: Bigger = greater
- **Intensity**: Darker = greater
- **Blur**: Clearer = greater
Tips for Creating Good Maps
A strategy for symbolizing multiple boundary categories: use color, width, and dashed lines to visualize hierarchy.
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- Congressional Districts
- Counties
- Census Tracts
De-clutter Your Map

Street labels placed without halo’s

Streets labeled with a 1 point halo in the same color as the background
De-clutter Your Map

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De-cluttering Continued…..

- Use label expressions to add an attribute value to your label, instead of using a symbol to represent the value.

- You can find the script used to format these labels in the PDF document attached to this webinar under ‘Using Label Expressions’. 
Use Basemaps Judiciously

The addition of this base map adds spatial reference, but also takes the focus off of the operational data.

Here, the base map has been dimmed by 35% and no longer takes the focus off of the operational data.
More on Basemaps.....

Look at the number of lakes in Connecticut!
Basemaps, What’s The Story Again?

Are those mountains? Could be some good hiking in the western part of the state.

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Basemaps, What’s The Story Again?

Are those mountains? Could be some good hiking in the western part of the state.

So many locations are close to the shore; must be spectacular views!

Look at the number of lakes in Connecticut!
Another Basemap Issue: Service Layer Credits

- Service Layer Credits can easily be moved so that they don’t interfere with the map data.

In ArcMap:
Insert ➔ Dynamic Text ➔ Service Layer Credits

This will allow you to move the credits to another spot on the map or move them off the map entirely.
Customize the Legend

- Use the ‘insert shape, fill shape’ functions in MS Word to easily give your legend a custom look with screen shots from your map.

Use the formatting options within ArcMap to customize your legend.
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Use the formatting options within ArcMap to customize your legend.
Quick Tips

➢ To set a default font for your MXD, use the Drawing toolbar to choose your desired font. This will prevent ArcGIS from defaulting to Arial every time you need to work with the font for this particular MXD.
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➢ Do you see a color online that you would like to use in a map you are creating and need to know the RGB values? Follow these steps to get the RGB values:
  
  • Take a screenshot of the desired color or colors using the ‘print screen’ key on your keyboard.
  
  • Paste the image into MS Paint.

  • Click on the color selector icon, the eyedropper, and then click on the color of interest in the image you pasted into Paint.

  • In the tool ribbon, this color should appear as one of your color choices. Select it and then choose ‘edit color’.

  • The RGB values for that color will appear in a dialogue box!
What Can Be Improved With This Map?
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Common Mistakes
**Mistake: Using the wrong scale for your analysis**

Using the wrong scale for your analysis may imply results that are invalid.
Solution: Appropriate Scale and Spatial Reference

- **Solution:** This is a county level map that uses multiple insets to convey the location of the county relative to the metropolitan region it is a part of, as well as the location of the county relative to the state. The audience is not overwhelmed with extraneous location data that is not relevant to the analysis or presentation.

- Also note the excellent use of visual hierarchy used in this map.
Mistake: Using quantitative color schemes to represent qualitative data, and vice versa

- The use of hue indicates a relationship between the categories that doesn’t exist: more of something or less of something.
Solution:

Quantitative data with a quantitative color scheme.

Qualitative data with a qualitative color scheme.

Map Credits: e-education.psu.edu
Mistake: Symbolizing a map in a way that makes the data on the map hard to understand

- In this case, it is impossible to tell what county each dot represents because the counties are hidden from view by the size of the dots. Also, the value that each dot represents is hard to interpret because of the number of classes and their proximate sizes.

Source: U.S. Census Bureau, Census 2000

Image credit: mph720-karishma-2012.blogspot.com
Solution: Limit the number of classes used, and create symbols whose sizes are easy to discern from one another.
Mistake: Creating a map that is vague.

- It is important to be explicit because your audience probably does not know the data as well as you do.

http://www.ranker.com/list/funny-maps/jacob-shelton
Resources

- Adobe Color CC

https://color.adobe.com/create/color-wheel/
Supplemental Documents

- You can find the following Documents attached to this webinar:
  - Data resources
  - How to dim basemaps
  - How to download data from the CDC Interactive Atlas of HD & ST
  - How to format lines and boundaries
  - How to add halo’s to labels
  - How to get RGB values from a screenshot
  - How to use label expressions
  - How to remove metadata from a basemap
  - CDC’s Cartographic Guidelines for Public Health
Data Sources

- For a full listing of data sources, visit the Chronic Disease GIS Exchange
- [cdc.gov/dhdsp/maps/gisx/index.html](https://cdc.gov/dhdsp/maps/gisx/index.html)
  
  - Public Health Data Resources
  - Geospatial Data Resources
  - Social Determinants of Health Data Resources
  - Environmental Health Data Resources
Cartography Resources

Cartographic Guidelines for Public Health is available for download at no cost at cdc.gov/dhdsp/maps/gisx/resources/tips-creating-ph-maps.html
Division for Heart Disease and Stroke Prevention Resources

- Chronic Disease GIS Exchange
- Interactive Atlas
- National Heart Disease and Stroke Maps
- Social Determinants of Health
- Data Trends and Maps
- Data and Statistical Resources
Web Resources

- **Colorbrewer2.org**
  - Color according to data type and/or media type
- **Color-hex.com**
  - Great for quantitative, sequential hue colorways
- **Naturalearthdata.com**
  - Basemaps appropriately generalized according to scale
- **Cartotalk.com**
  - Cartography forum
- **Inkscape.org**
  - Free, open source alternative to Adobe Illustrator
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For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.