IOWA

Institute for Public Health
Practice, Research and Policy

Visualize This 2

Chart Smarts: Design and Deliver Meaningful Visualizations.

2026 Session 1

Communicating Data Team

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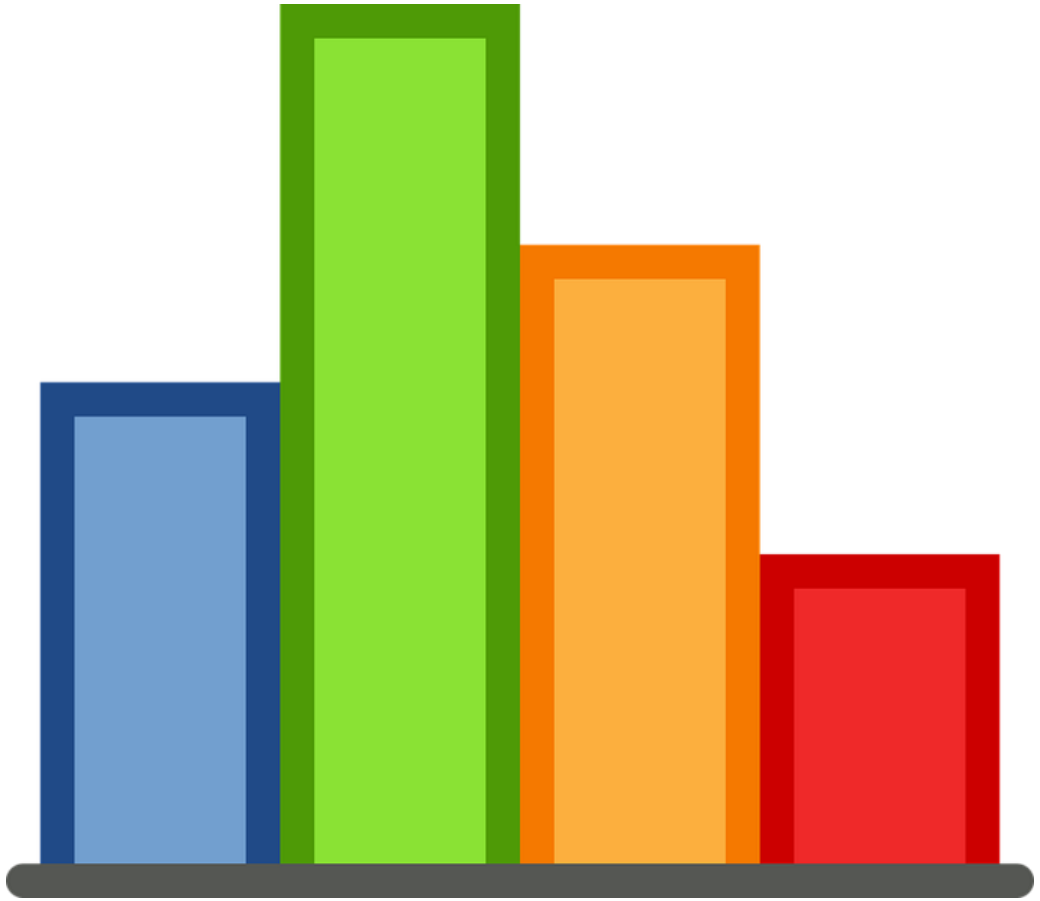
Training provided in partnership with the Institute for Public Health Practice, Research and Policy through a contract from the Iowa Department of Health and Human Services

Data Training Opportunities

- Data Basics
- Tackling Data
- Visualize This
- Disaggregate It

Check out our website to see upcoming training dates!

Menti.com



Course Schedule

Tuesday, February 3rd, 10:00am-11:30am CST Live Learning Session #1 – Kick off

"Work at home" **Course 1** and homework.

Tuesday, February 10th, 10:00am-11:30am CST Live Learning Session #2

"Work at home" **Course 2** and homework.

Tuesday, February 17th, 10:00am-11:30am CST Live Learning Session #3

"Work at home" **Course 3** and homework

Tuesday, February 24th, 10:00am-11:30am CST Live Learning Session #4

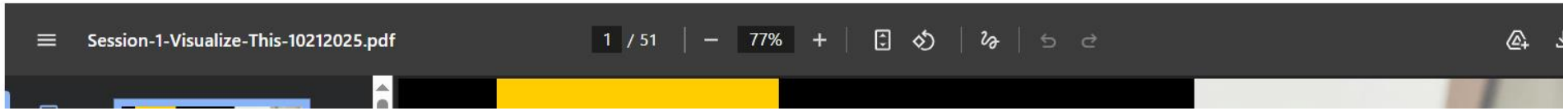
Accessing Training Resources

- Visit the webpage that was dropped in the chat.
- View the documents in the "Preview" panes or click the buttons to download the documents.
  - Download the activity worksheet to fill in your answers.
- Will also be included in the follow up email.

- *We ask that you do not share these slides beyond what we are doing today as this is University of Iowa property. We appreciate you keeping this information and using it for training purposes.*

Visualize This 2 Resources – IHHS

Training Resources



Institute for Public Health Practice, Research and Policy

Who We Are | What We Do | Work With Us | Our Initiatives

Data and Surveillance Resources

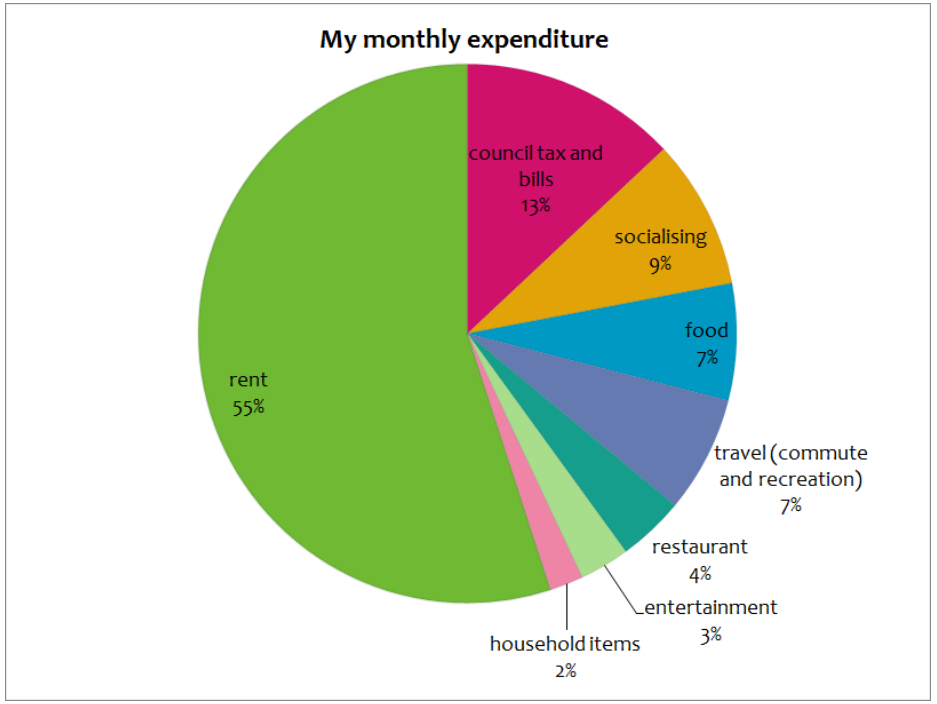
Data Resources

Overall Course Objectives

By the end of this 4-week course, participants will be able to:

- Select the appropriate chart type for your data
- Identify critical formatting elements for effective data visualizations
- Create data visualizations for basic descriptive epidemiological data
- Create data visualizations that demonstrate comparisons and evaluation
- Describe the difference between common visualization tools such as infographics, data placemats, and data dashboards

People don’t swing into action because of a pie chart.



Learning Objectives for Session 1

1. Select the appropriate chart type for your data
2. Create graphs/charts for Exploration vs. Explanation
3. Identify critical formatting elements for effective data visualizations

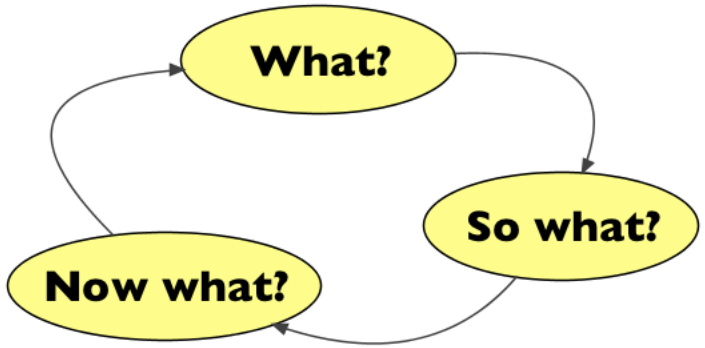
Effective Communication--3 Questions to Ask

What is the purpose of this communication?

Who will use the information?

What are the key messages for this audience?

MESSAGE: What? So What? Now What?

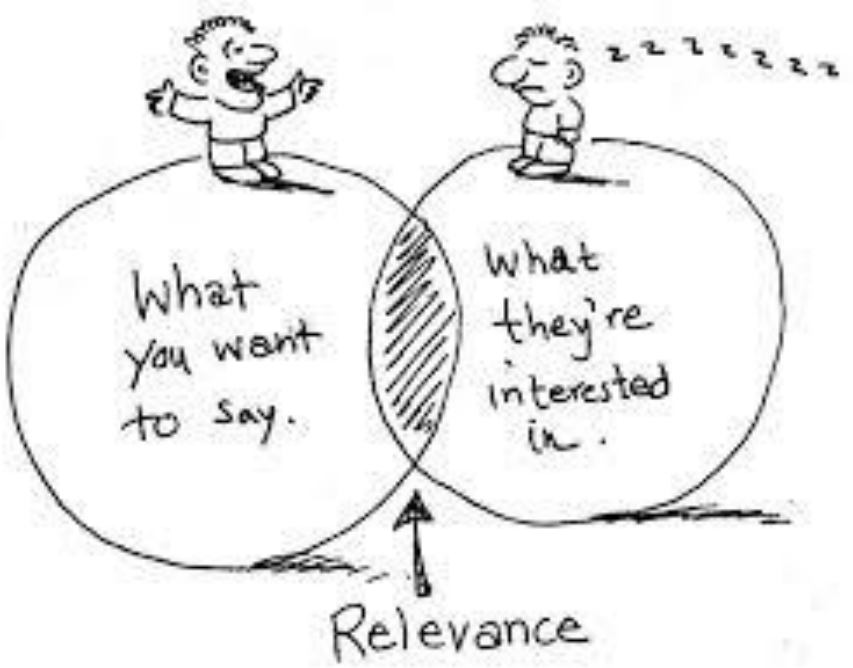


- What?
  - What is the health issue/current status in the population? What are the primary risk factors for this health issue?
  - Are there disparities in the outcome/in the risk factors?
  - Descriptive epi profile of issue/risk factor (person, place, time)
- So What?
  - Why is this an important issue? What would we expect to happen if we don't do anything? How to make this most compelling?
- Now What?
  - What is the appropriate/relevant action to take?

Who is your audience?

Communicating with the Audience

- Understand your audience/ their current position
- What do they care about?
- What are their information needs?
- How does your message solve their problem? What is their role in addressing this problem?
- Where, when and how do they seek information?
- What challenges are they likely to have?



Be aware of challenges

- Health literacy
- Accessibility
- Numeracy – misunderstanding of risk and probability
- Cognitive processing limits – the 7 digit phone number
- Uncertainty – go ahead, just embrace it!
- Framing – loss vs. gain
- Defensive processing
- Role of emotion

Audiences have expectations for the information they receive:

1. They expect to be told why they should believe or do what is recommended.
2. They expect to be given the rationale for how experts reach their conclusions.
3. They expect to know what to do with the information they receive.

Module 1

What is the Right Type of Chart for my Data?

What is the Data That You are Working With?

What is the main point of my data?
What is the story that I can tell?

- **A single number** – number of cases, prevalence rate, percentage
- **Comparing to a benchmark** – comparing your county to the state rate, or to HP 2030 objectives
- **Comparison between groups** – showing disparities between groups, comparing county rates, showing prevalence differences over years, effect of an intervention/treatment
- **Survey results** – this will depend on the type of questions/response categories that you are using
- **Changes over time** – comparing rates in one group over time or across multiple groups over time
- **Patterns** – you want the audience to see relationships between variables or across groups

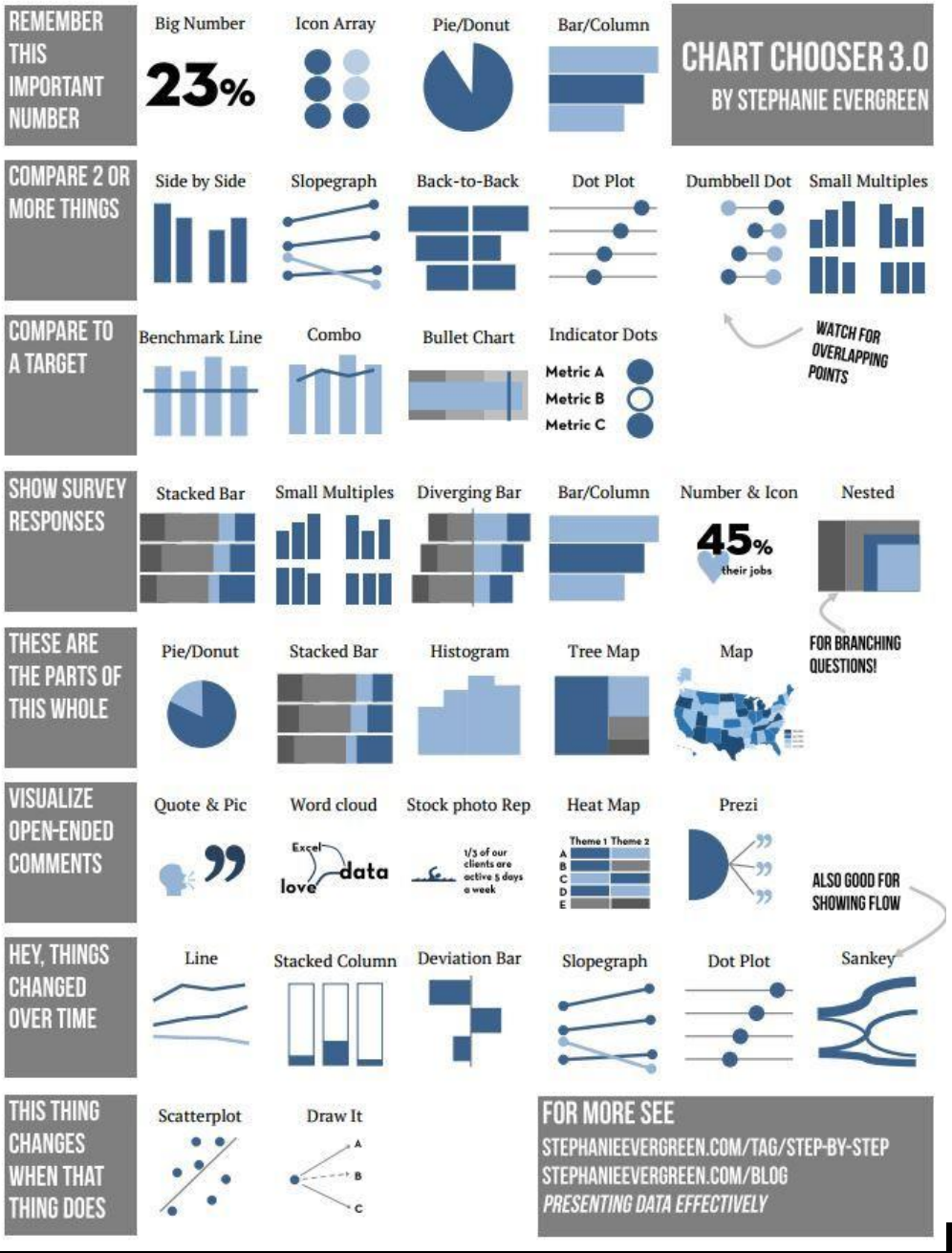
How do I choose the right chart?

Let’s start with quantitative data

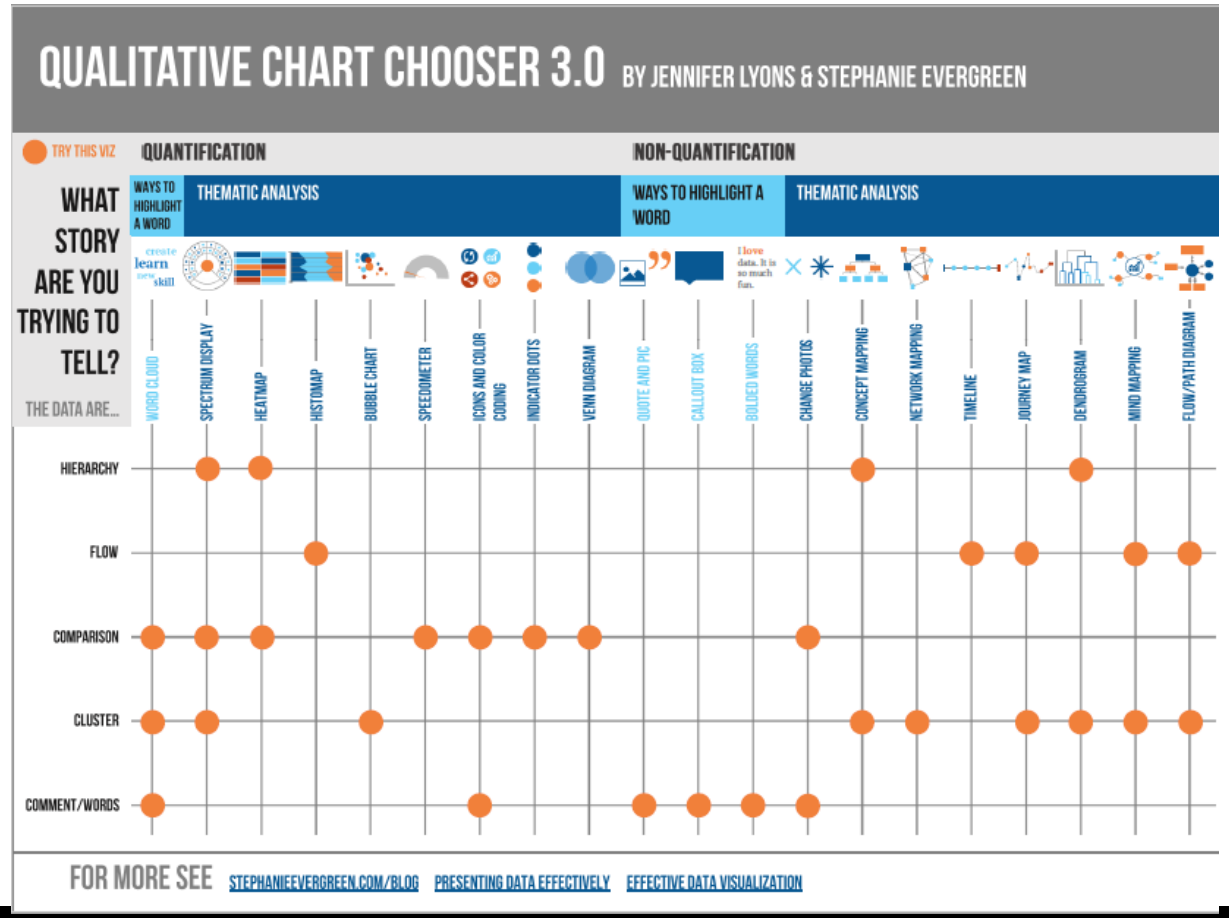
A single number (number of cases; prevalence rate; percentage) Big number [1] Icon array [2] Pie chart Bar/column chart	**Comparison (showing disparities between groups; comparing county rates; showing differences between years)** Side-by-side column chart Slope graph [3] Back-to-back bar chart [4] Dot plot [5] Small multiples [6]
Beating a benchmark (comparing your county to the state rate or to HP2020 objective) Column chart with benchmark line [7] Combo chart [8]	**Survey results (this will depend on the type of question/response categories you are using)** Stacked bar chart Small multiples [6] Back-to-back bar chart [4] Bar/column chart Number and icon Pie chart
Parts of a whole Pie chart Stacked bar chart Histogram [9] Map	**Correlations (you want to visually show how two factors are related)** Scatterplot Diagram Don’t visualize
Change over time (comparing rates over time-one group or multiple groups) Line chart Stacked column chart Deviating bar chart (akin to back-to-back) Slope graph [3] Dot plot	**Qualitative data** Word cloud Picture with text

Adapted from Evergreen, S. D. H. (2017). *Effective data visualization: The right chart for the right data.*

Quantitative Data



What about if I have qualitative data?



Evergreen, S. and Lyons, J. (2017). *Qualitative Chart Chooser 3.0.* Evergreen Data. https://stephanieevergreen.com/qualitative-chart-chooser-3/

Let’s look at an example

Example – Obesity in Public Health Region 6

% Adult Obesity in Region 6 Iowa counties 2016-2021 County Health Rankings

Public Health Region	County	2016	2017	2018	2019	2020
6	Benton	33	34	35	33	36
6	Black Hawk	29	30	31	31	31
6	Buchanan	33	35	33	33	33
6	Cedar	33	32	34	36	35
6	Clayton	35	32	33	34	36
6	Clinton	31	33	32	32	33
6	Delaware	32	34	35	38	33
6	Dubuque	28	29	28	30	34
6	Iowa	30	31	30	34	32
6	Jackson	33	33	33	33	31
6	Johnson	23	23	23	25	26
6	Jones	32	38	38	40	38
6	Linn	30	31	33	33	34
6	Scott	31	32	33	32	33

* baseline data from 2005-2008 33.9%; HP2020 target was 30.5%

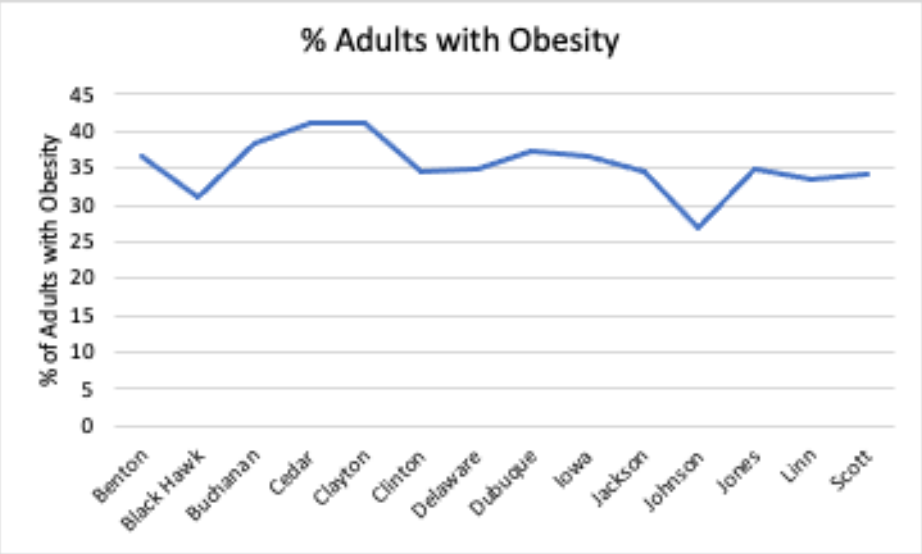
** baseline data from 2013-2016 38.6%; HP2030 target for 2030 36.0%

2021 Adult obesity - County Health Rankings IA					
% Adults with Obesity	Food Environment Index	% Physical Inactivity	Income Inequality Ratio	Rural	Metr (pop over 250,
37	9.0	26	3.9		
31	8.0	29	4.3		Y
39	9.0	27	4.2	Y	
41	9.1	25	3.5	Y	
41	8.7	30	3.8	Y	
35	8.0	30	4.2	Y	
35	9.2	28	3.8	Y	
37	8.7	25	4.0		Y
37	9.3	26	3.7	Y	
34	8.3	29	4.5	Y	
27	9.0	21	5.6		Y
35	8.8	28	3.5		
33	8.7	24	4.0		Y
34	8.8	25	4.5		Y

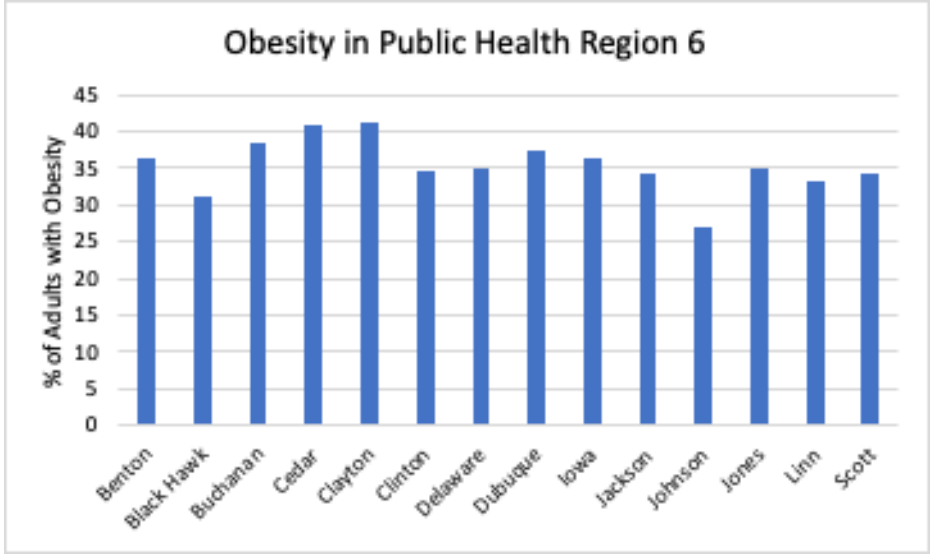
What are the patterns and trends of obesity in Iowa's public health region 6?

What is the correct chart type?

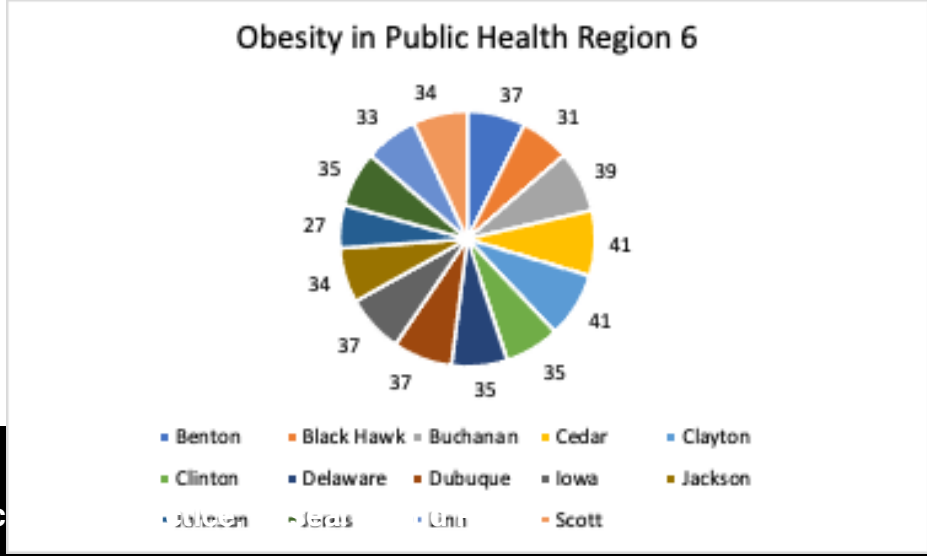
A



B



C

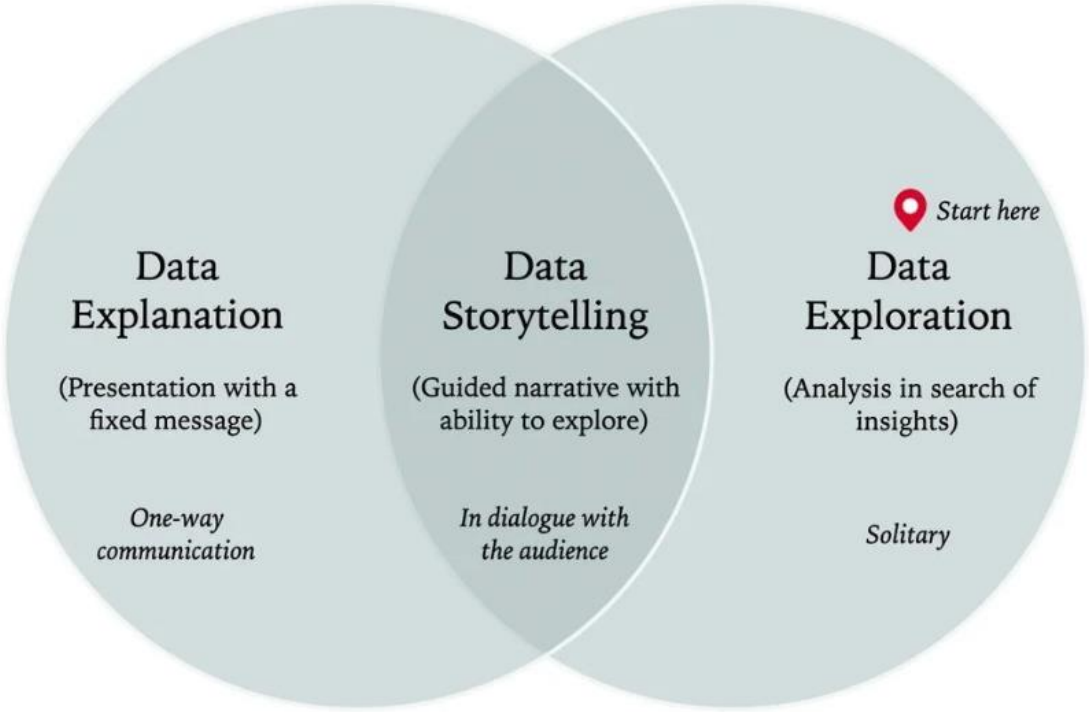


Source: https://www.countyhealthrankings.org/app/iowa/2020/downloads

Module 2

Creating Graphs/Charts for Exploration vs Explanation

Exploration vs. Explanation



Exploratory vs Explanatory Analysis/Graphing

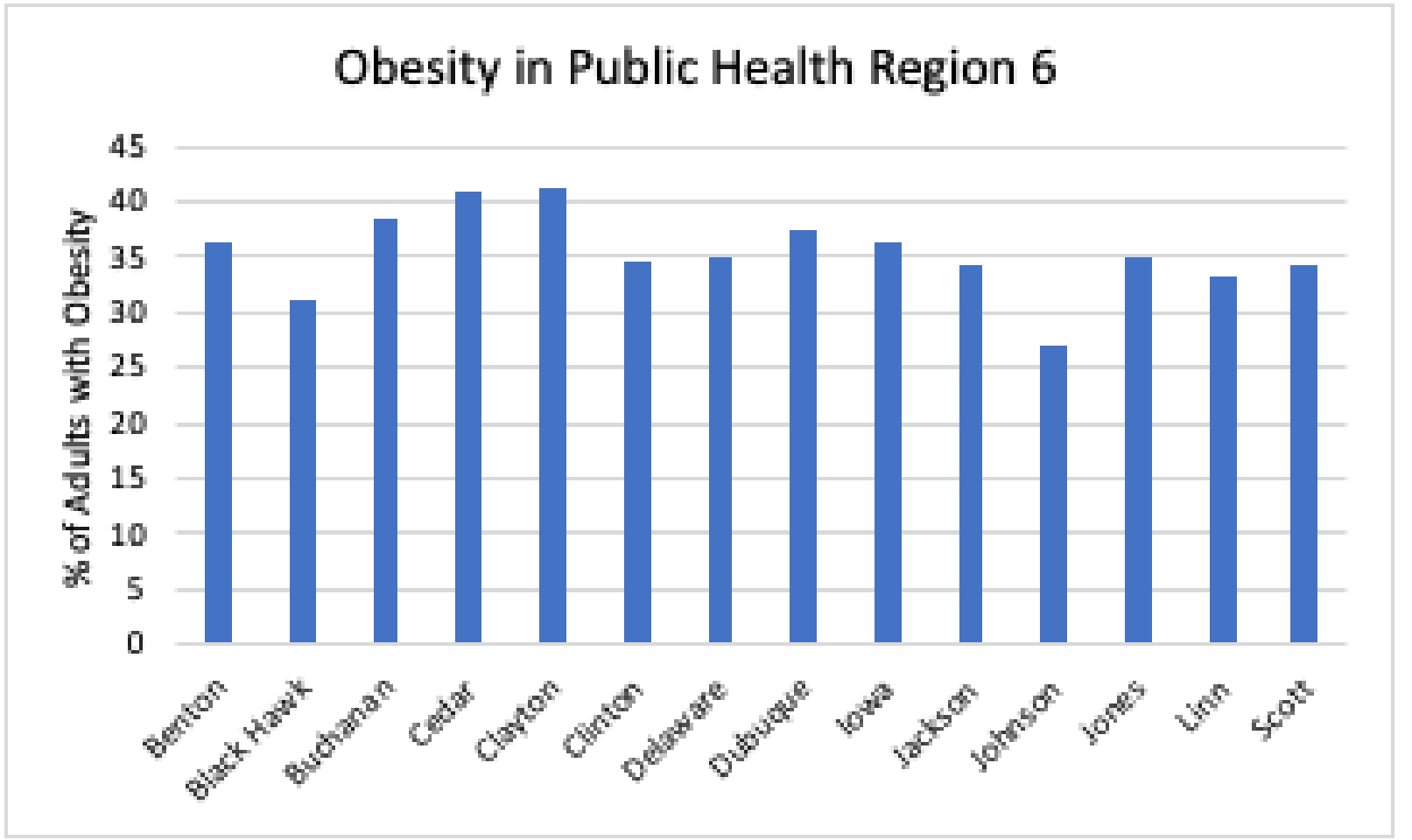
Exploratory – "quick and dirty" plots to understand the data, identify patterns, outliers, etc. Helps to identify ways to manage, describe, and analyze the data and tell the most important story

Explanatory – present the "final results" to decision makers to drive action. Highlight key insights—the takeaway story.

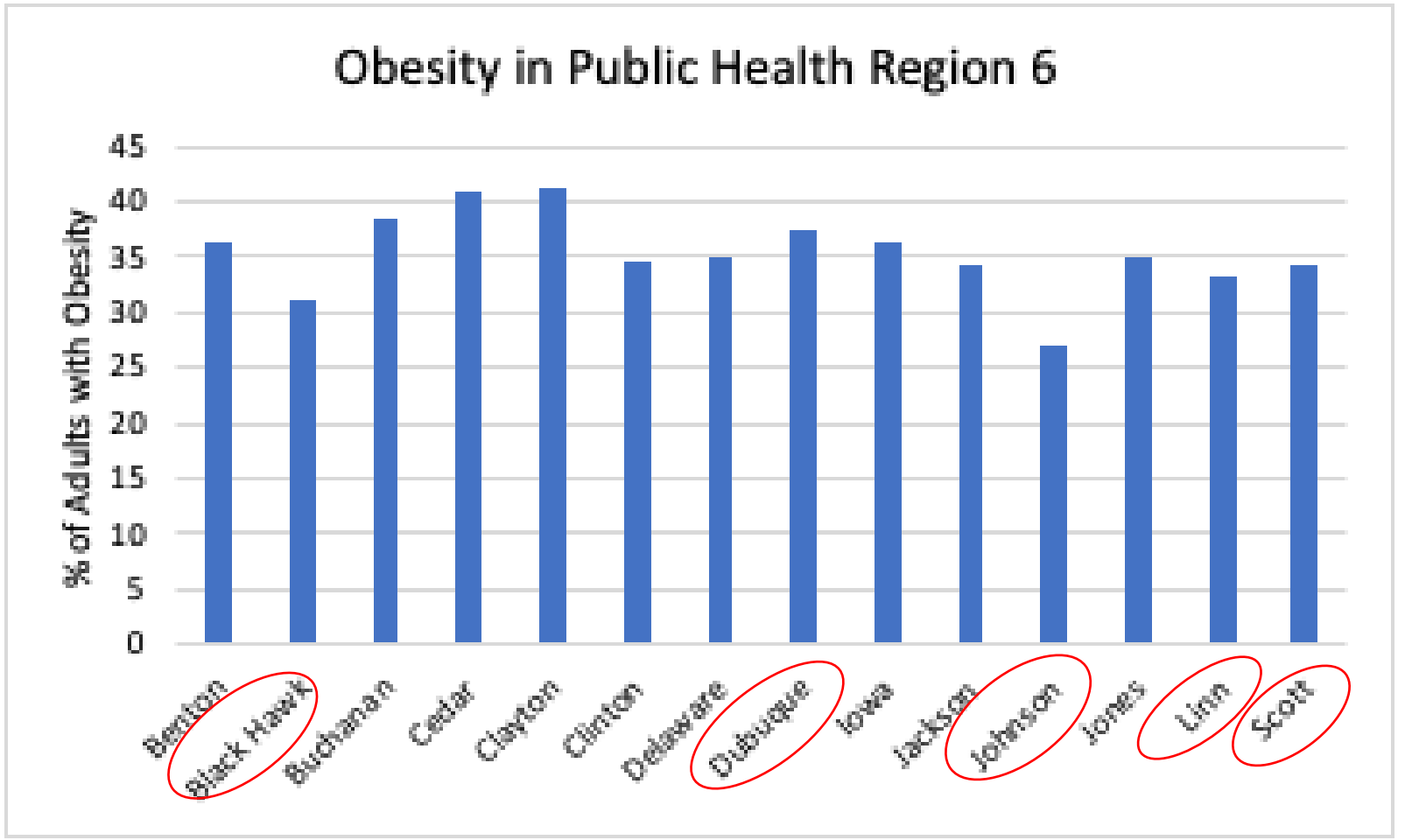
Statistically significant vs. Clinically Meaningful

Significant based on a statistical test as opposed to a difference that will lead to better health outcomes.

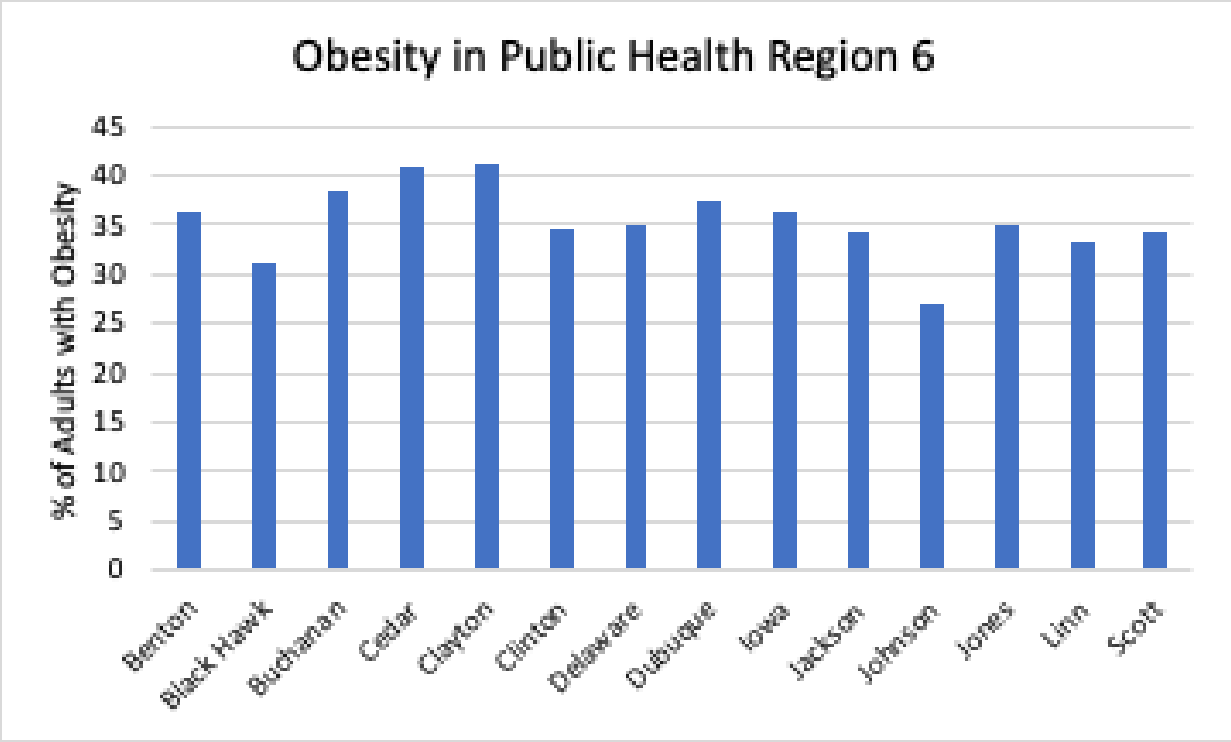
Obesity Rates for Public Health Region 6 (2023)

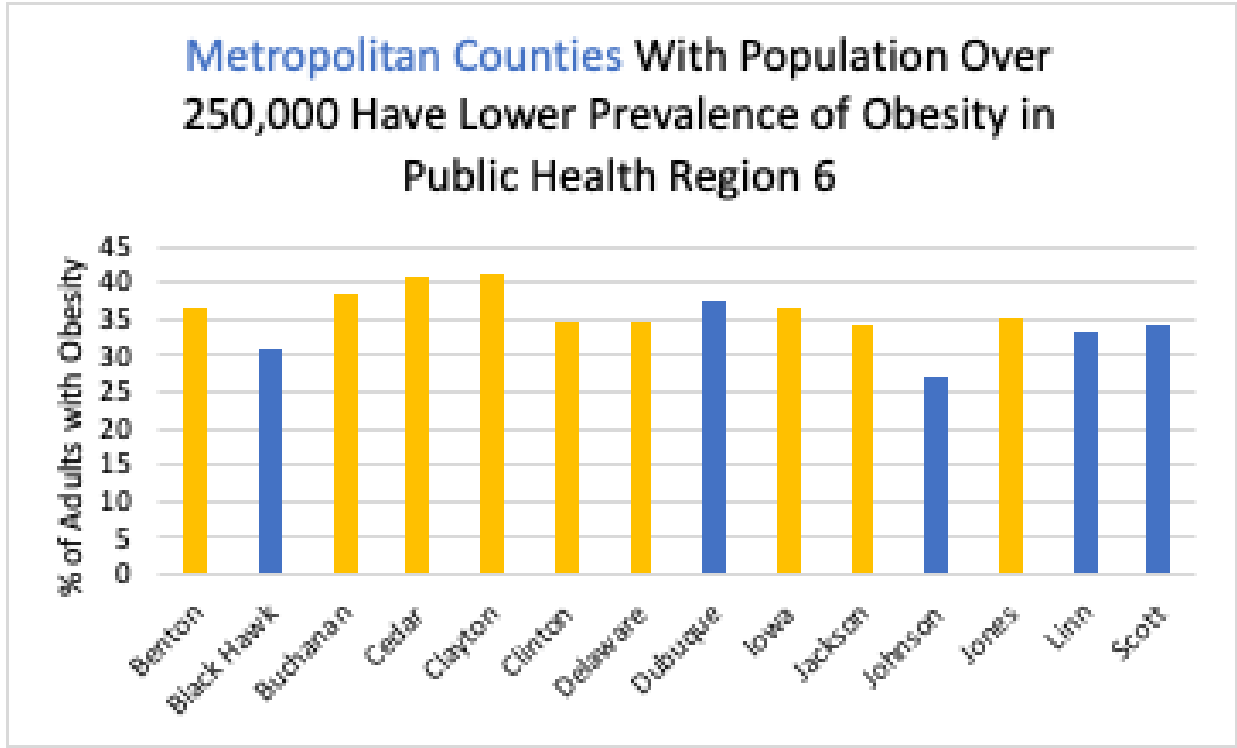


Obesity Rates for Public Health Region 6 (2023)



Example – Obesity in Public Health Region 6





Are there other chart types that you might consider?

% Adult Obesity in Region 6 Iowa counties 2016-2021 County Health Rankings

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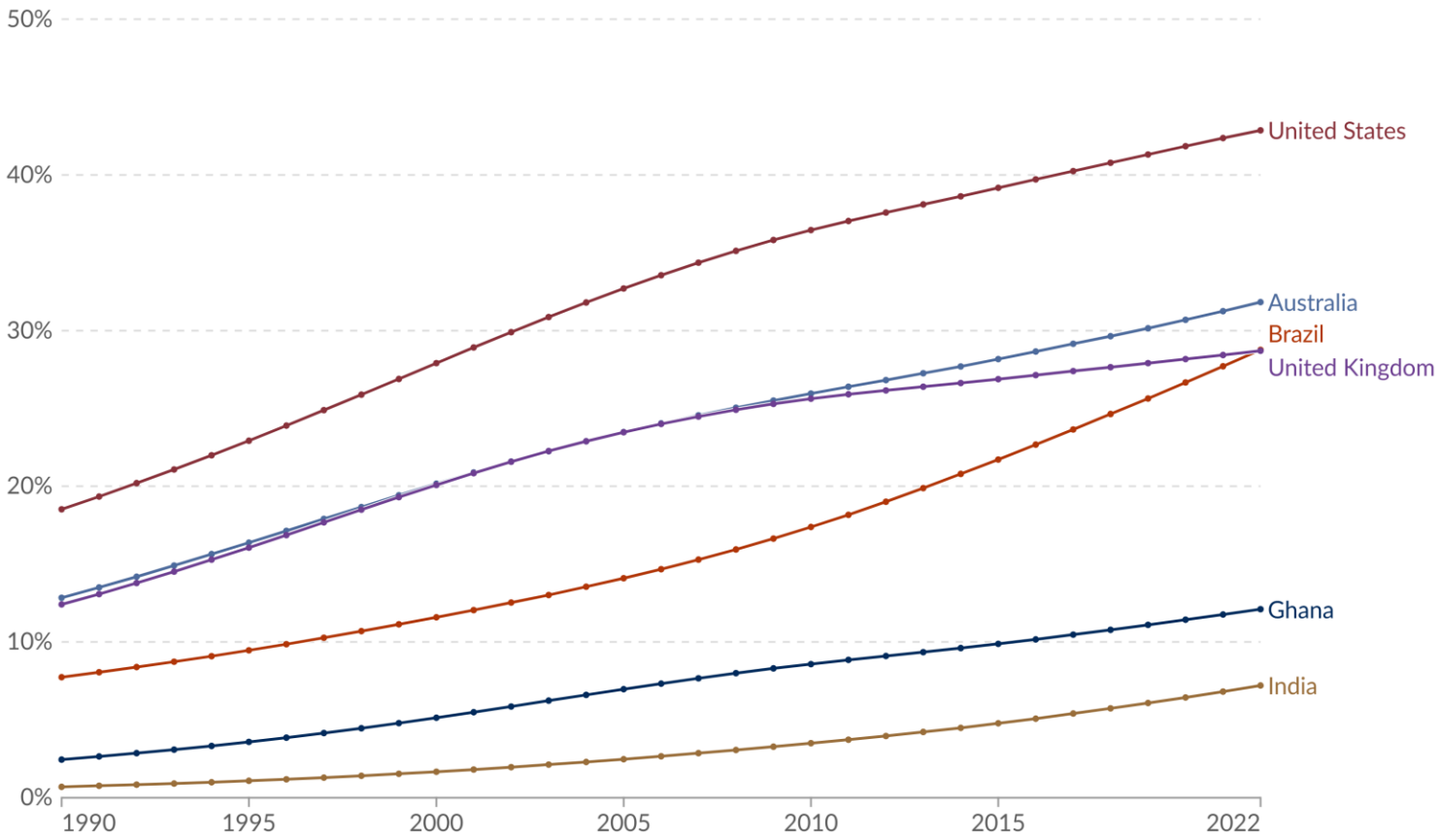
35	8.8	28	3.5		
33	8.7	24	4.0		Y
34	8.8	25	4.5		Y

Obesity in adults, 1990 to 2022

Our World in Data

Estimated prevalence of obesity[1], based on general population surveys and statistical modeling. Obesity is a risk factor[2] for chronic complications, including cardiovascular disease, and premature death.



Data source: World Health Organization - Global Health Observatory (2025)

OurWorldinData.org/obesity | CC BY

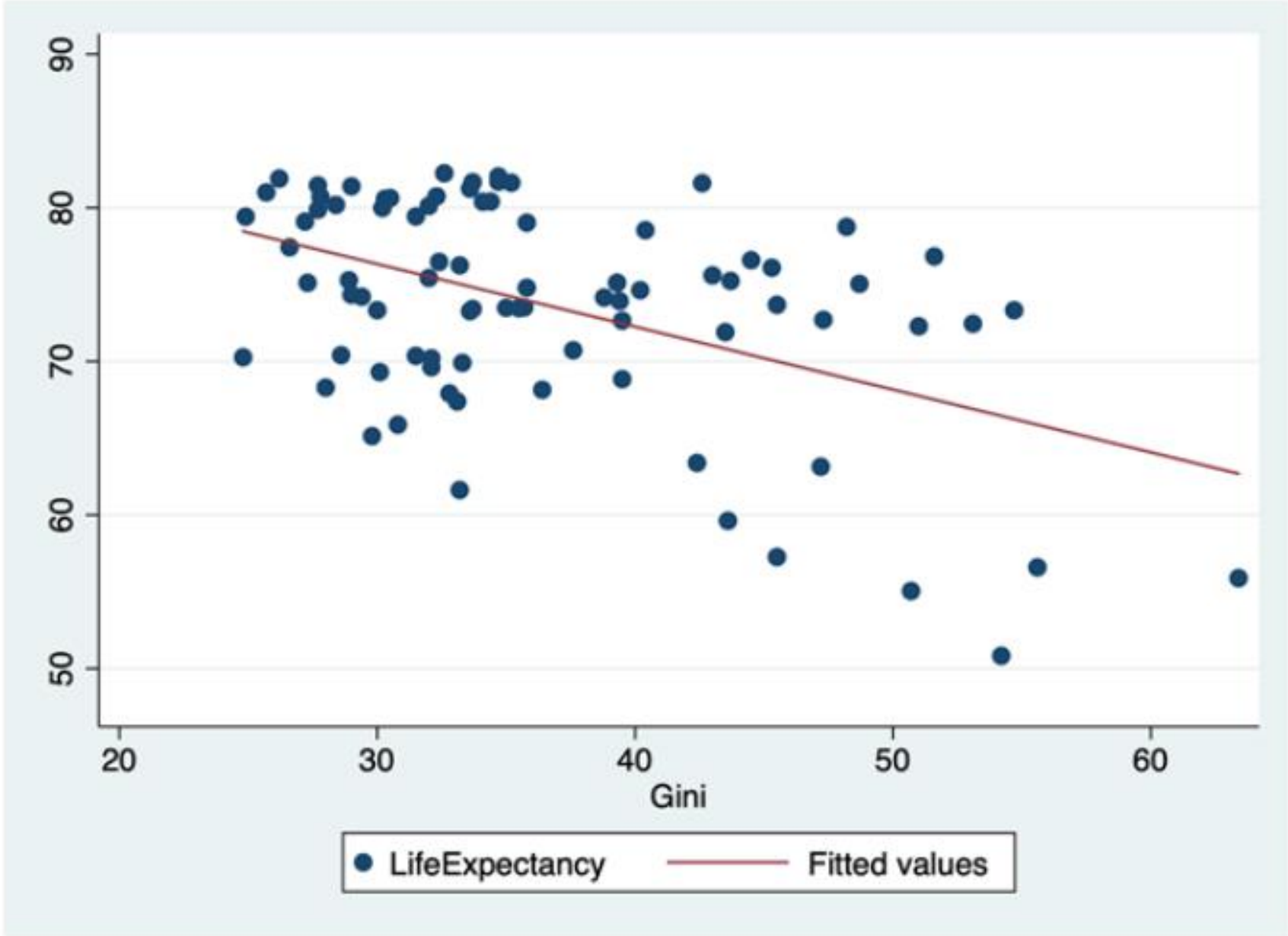


FIGURE 1. Scatterplot of life expectancy and Gini coefficient

Questions?

Small Group Activity

- What is the data that you work with? Who are some of the audiences that you share this data with? What do they need to know?

- What are some of the analytic methods that you use with your data? What types of charts and graphs do you create/want to create?

Module 3

How to create effective data visualizations

TEXT

- Use a descriptive title – What is the key takeaway?
- You can use subtitles/annotations to bring attention to a particular point.
- Label the data directly—do not assume people read the legend (or place the legend at the top so people know what they are looking at right away)
- Unclutter your graphic
- Be aware of the **font** you are using (serif vs sans serif is a thing)

ARRANGEMENT of Charts

- People assume things near each other are related
- Proportions must be accurate (bars in bar charts should reflect relative size)
- Stick to convention (Percentage goes from 0 to 100)
- 0 on the Y-axis may not be needed for something where 0 is not a realistic value (stock market values)
- Ordering of data to emphasize your main point
- Don’t go overboard—2D graphs are fine
- Decoration can distract (no need for icons or graphics that take focus away from main point)

COLOR

- Color grabs our attention
- The color you use is driven by the purpose of the communication (learning vs. emphasis)
- Use the org's color scheme if possible
- A change in color indicates a change in meaning
- Remember color-blind readers (10% of adult pop)
- Color can be used for decorating, navigating, creating emphasis

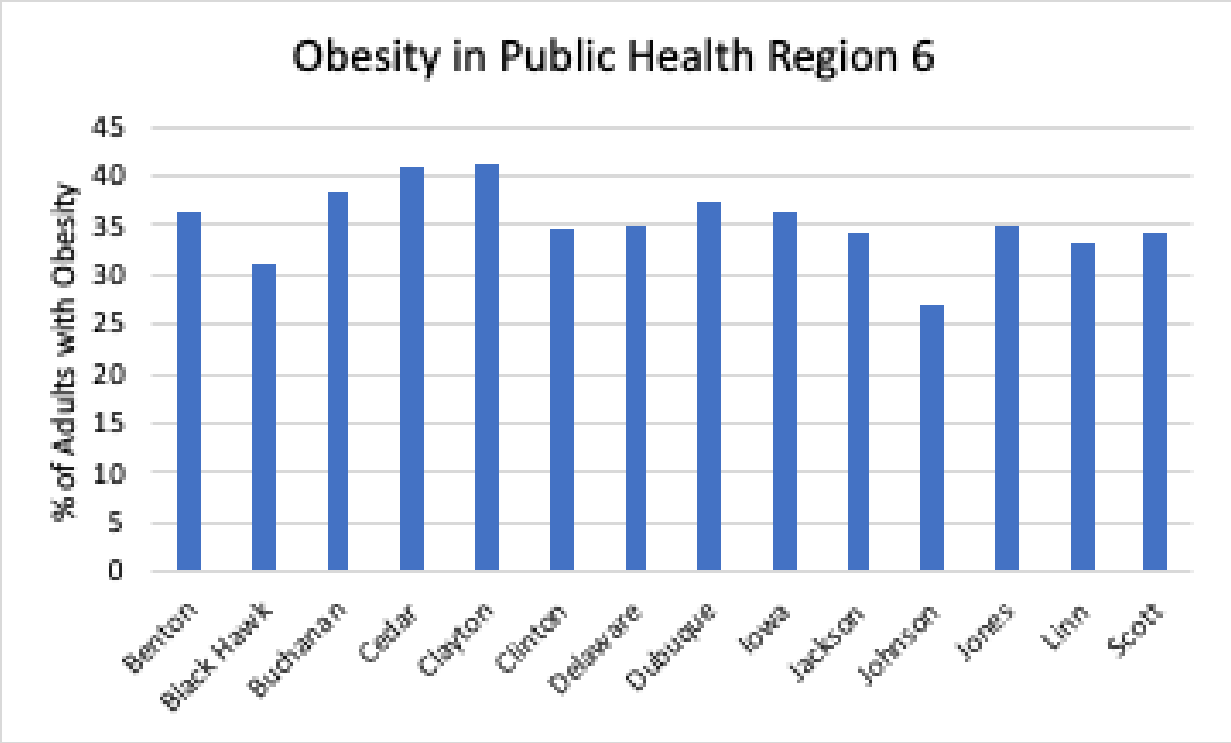
Incorporating People-Centeredness into your Visualization

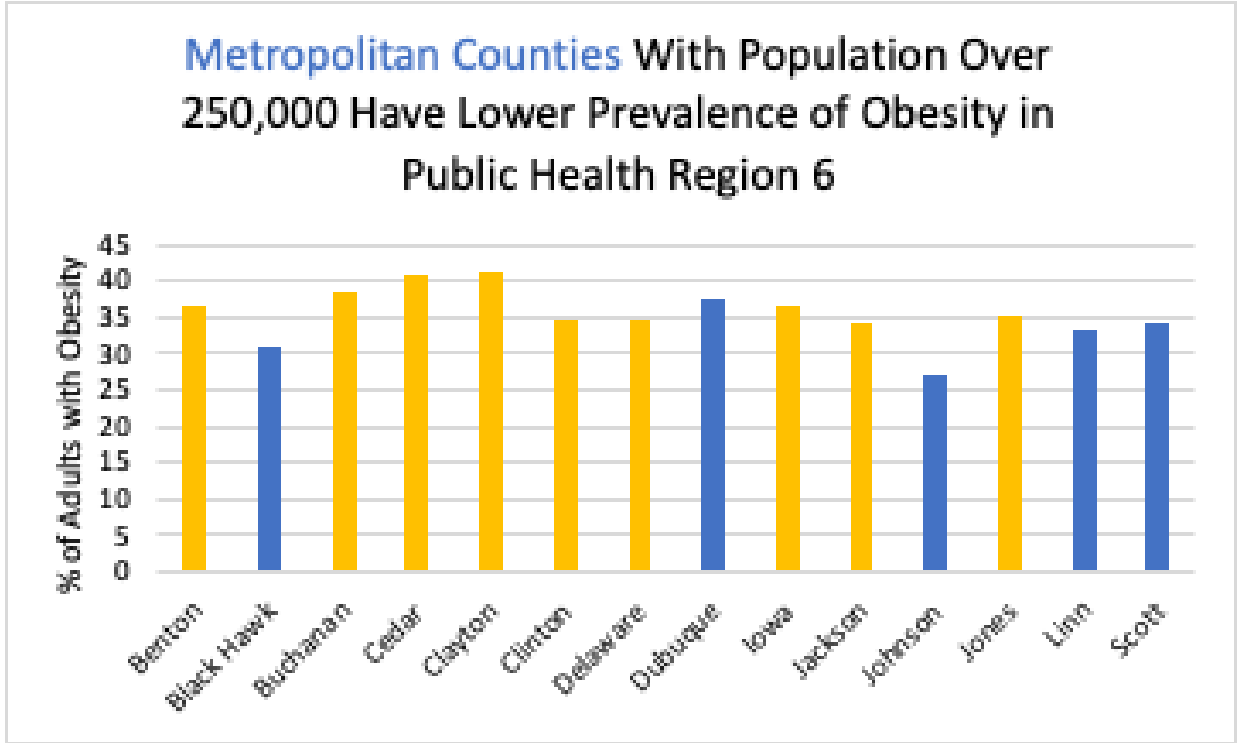
Demonstrate Empathy (start with cultural humility)

- Use People-first language
- Avoid Othering
- Order groups in a purposeful way
- Consider Missing Groups
- Use Color/Patterns with a People-Centeredness Awareness
- Incorporate Accessibility

"Do No Harm Guide. Applying Equity Awareness in Data Visualization" 2021

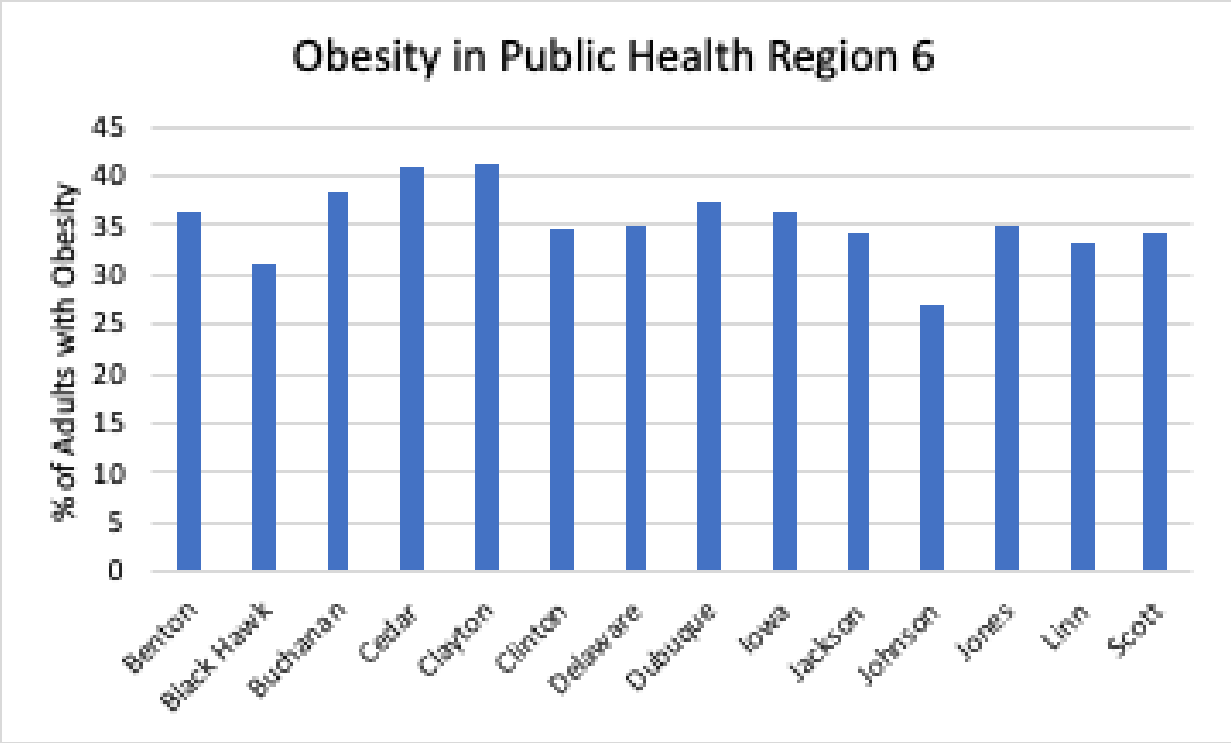
Example – Obesity in Public Health Region 6

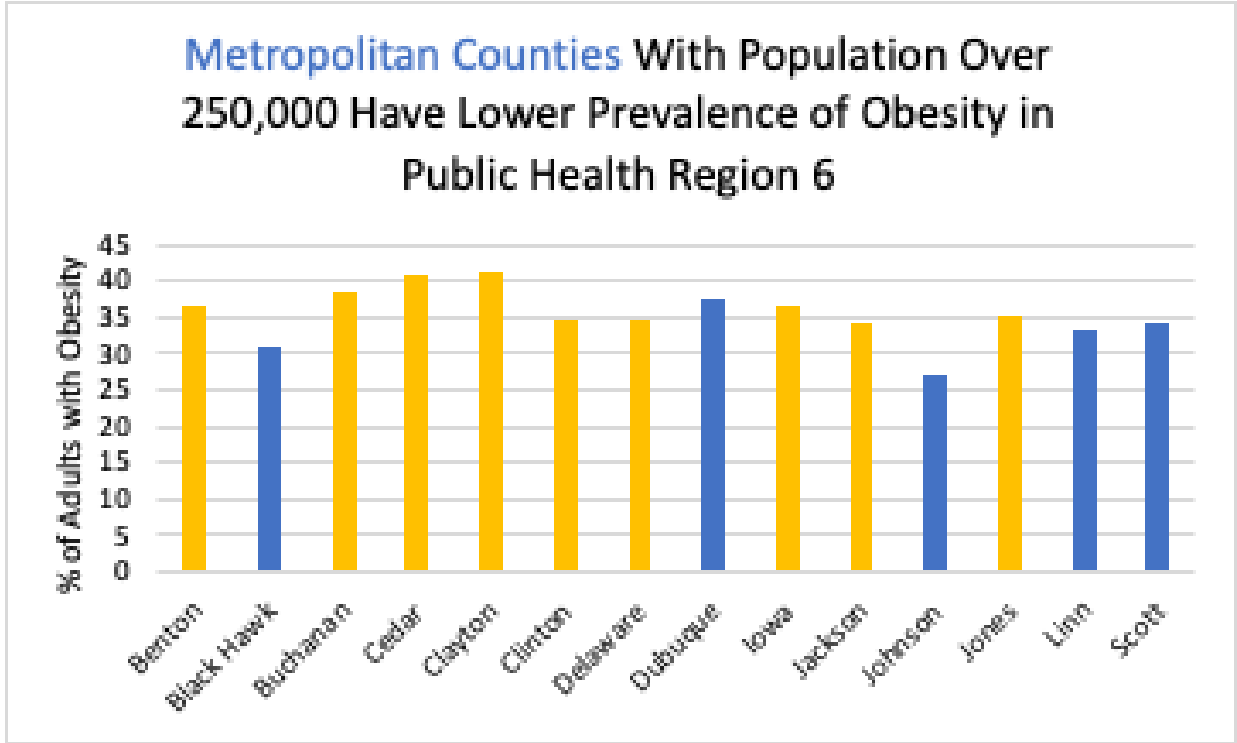




Source: https://www.countyhealthrankings.org/app/iowa/2020/downloads

Example – Obesity in Public Health Region 6

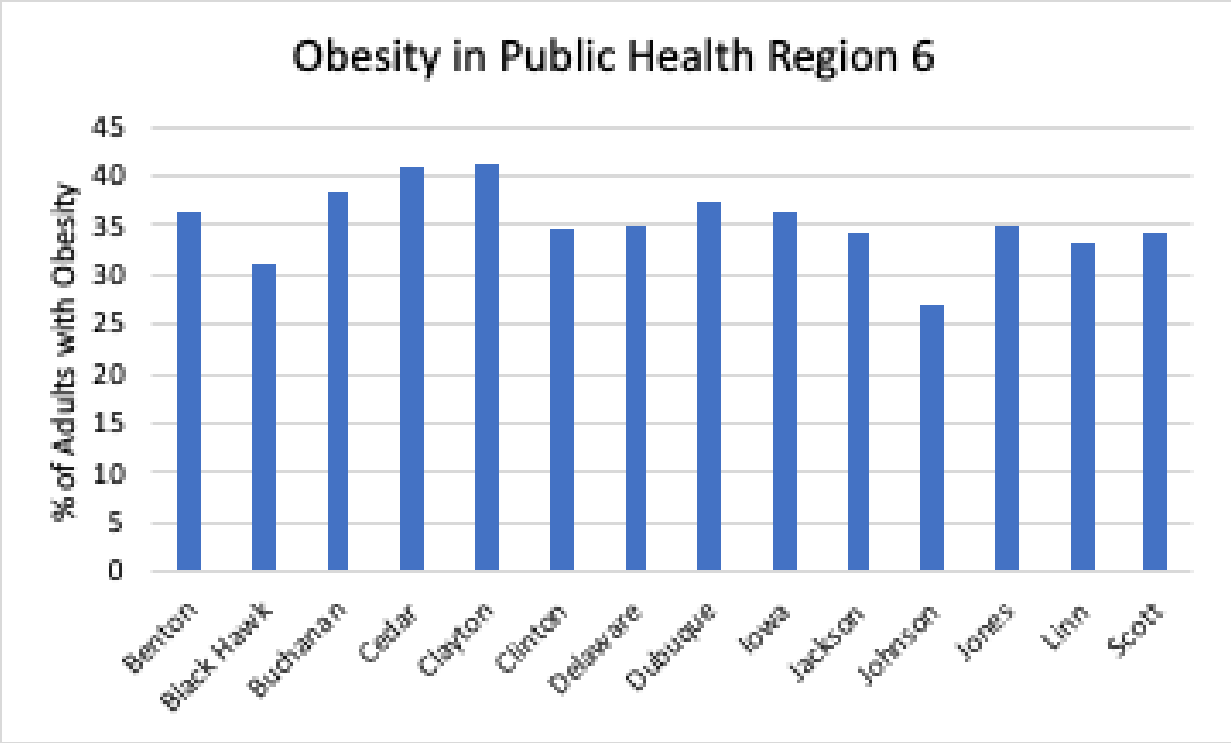


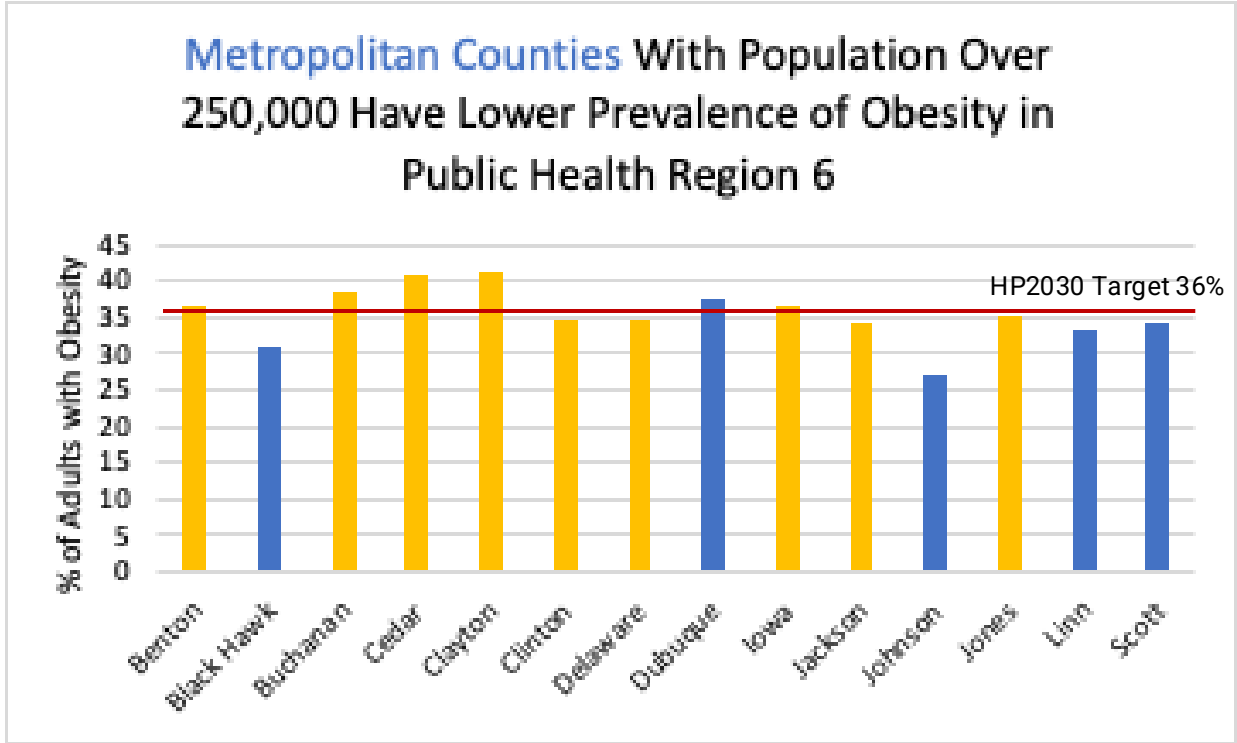


Source: https://www.countyhealthrankings.org/app/iowa/2020/downloads

HP2030 Reduce the proportion of adults with obesity. Target 36.0%

Example – Obesity in Public Health Region 6





Source: https://www.countyhealthrankings.org/app/iowa/2020/downloads

DATA VISUALIZATION CHECKLIST

This checklist guides the development of high-quality data visualizations. Rate each aspect of the data visualization by circling the most appropriate number, where 2 points means the guideline was fully met, 1 means it was partially met, and 0 means it was not met at all.

n/a should not be used frequently, but reserved for when the guideline truly does not apply. For example, a pie chart has no axes lines or tick marks to rate. If the guideline has been broken intentionally to make a point, rate it n/a and deduct those points from the total possible. Guidelines particularly helpful for accessibility are marked with 

Refer to the Data Visualization Anatomy Chart on the last page for guidance on vocabulary and the Resources at the end for more assistance.

TEXT

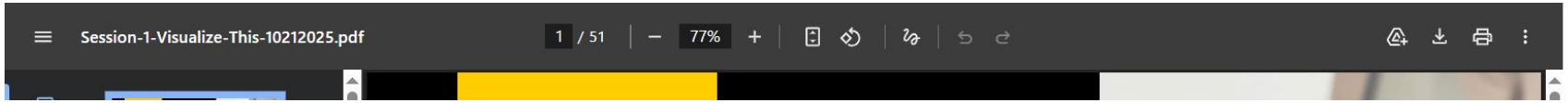
Graphs don't contain much text, so existing text must encapsulate your message clearly and concisely.

Guideline	Description	Rating
8-20 word descriptive title is a full sentence, left-justified, in upper left	Rather than a generic phrase, use a full, descriptive sentence that encapsulates a takeaway message about the graph's finding or "so what?" When communicating to Western cultures put the title in the upper left. Not centered. 	2 1 0 n/a
Subtitle and/or annotations provide additional information	Subtitles and annotations can add explanatory and interpretive power to a graph. Use them to answer potential viewer questions or to highlight specific data points. Annotations only count if they're within the graph, not in a paragraph around it.	2 1 0 n/a
Text size is hierarchical and readable	Titles are a larger font size than subtitles or annotations, which are larger than labels, which are larger than source information. The smallest text is at least 9-point font size for arm's length reading, at least 20 for large room reading 	2 1 0 n/a

Guidelines for Creating Simple Excel Charts/Graphs

Visualize This 2 Resources – IHHS

Training Resources



Questions?

Homework

- Select data to use throughout this course – it will be used to complete your final homework assignment.
  - This data can be any data that you are interested in
  - Raw or analyzed
  - Program or surveillance data
  - You can work alone or in a pair

- What is the main question(s) that you are trying to answer?

Institute for Public Health Practice, Research and Policy

Thank you!

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abigail-stock@uiowa.edu

Choosing the Right Data Visualization Tool

Select the right visualization tool based on your audience needs, goals, and available resources.

Infographics

Best For:
- One-time storytelling
- Public communications
- Executive summaries

Best Practices:
- Have a clear story/ message
- Logical information flow
- Consistent visual styling
- Emphasize visuals over text

Resources Required:

High initial design effort
Minimal maintenance

Distribution Methods:
- Print materials
- Digital platforms
- Presentations

Software Options:
- Adobe Creative Suite
- Canva

Data Placemats

Best For:
- Client engagement
- Collaborative analysis
- Interim findings

Best Practices:
- Clear visualizations
- Focus on data interpretation
- Include space for feedback
- Questions for discussion

Resources Required:

Moderate setup time
Periodic updates

Distribution Methods:
- In-Person/virtual meetings
- Email
- Collaborative platforms (e.g., Teams)

Software Options:
- Excel
- Tableau

Dashboards

Best For:
- Ongoing monitoring
- Interactive exploration
- Regular reporting

Best Practices:
- Focus on key metrics
- Group related information
- Intuitive filtering controls
- Include user training

Resources Required:

High technical expertise
Ongoing maintenance

Distribution Methods:
- Internal portals
- Web applications
- Regular reports

Software Options:
- PowerBI
- Tableau