

IOWA

Institute for Public Health
Practice, Research and Policy

Visualize This 2

Chart Smarts: Design and Deliver Meaningful Visualizations.

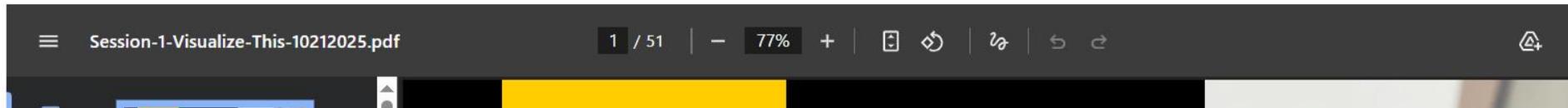
2026 Session 3



Visualize This 2 Resources – IHHS



Training Resources





Data and Surveillance Resources



Data Resources



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



Course Objectives

By the end of this 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



Small Group Activity

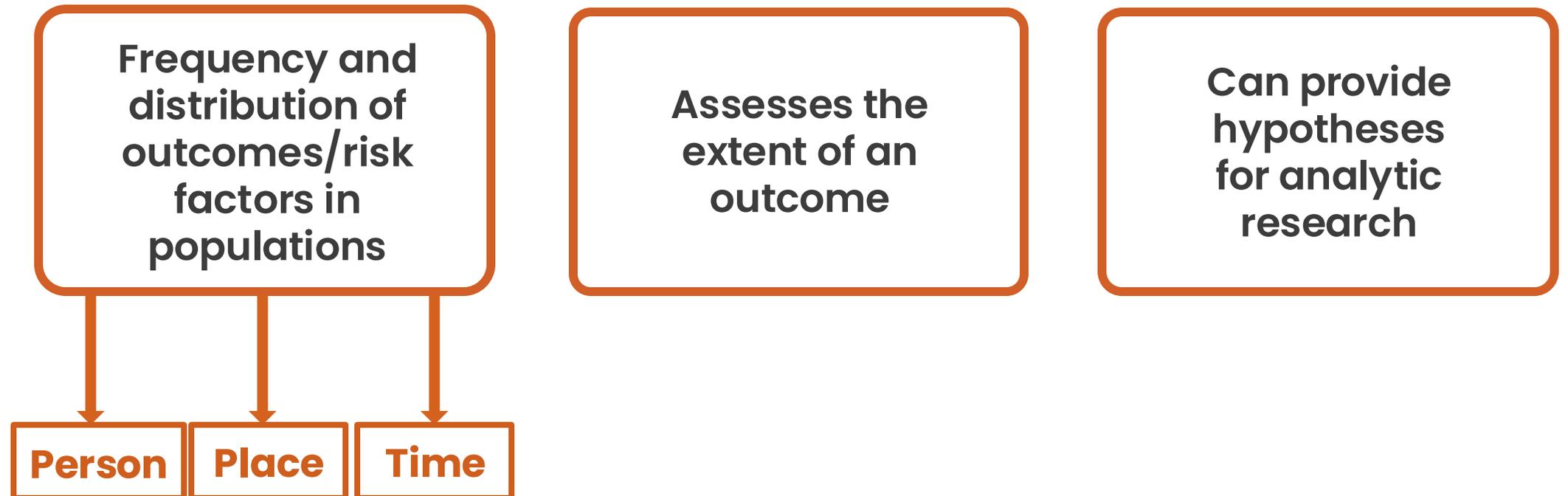
- Share the rough sketch of your data visualization (if you didn't have time to create the rough sketch, talk through what you are planning—chart type, important vis features, etc)
- Use the Data Viz Checklist to make suggestions on what can be improved on the Presenter's visualization. (Is the takeaway message clear and does the vis seem appropriate for the intended audience?)
- Totally low stakes---this is all a work in progress!



Debrief

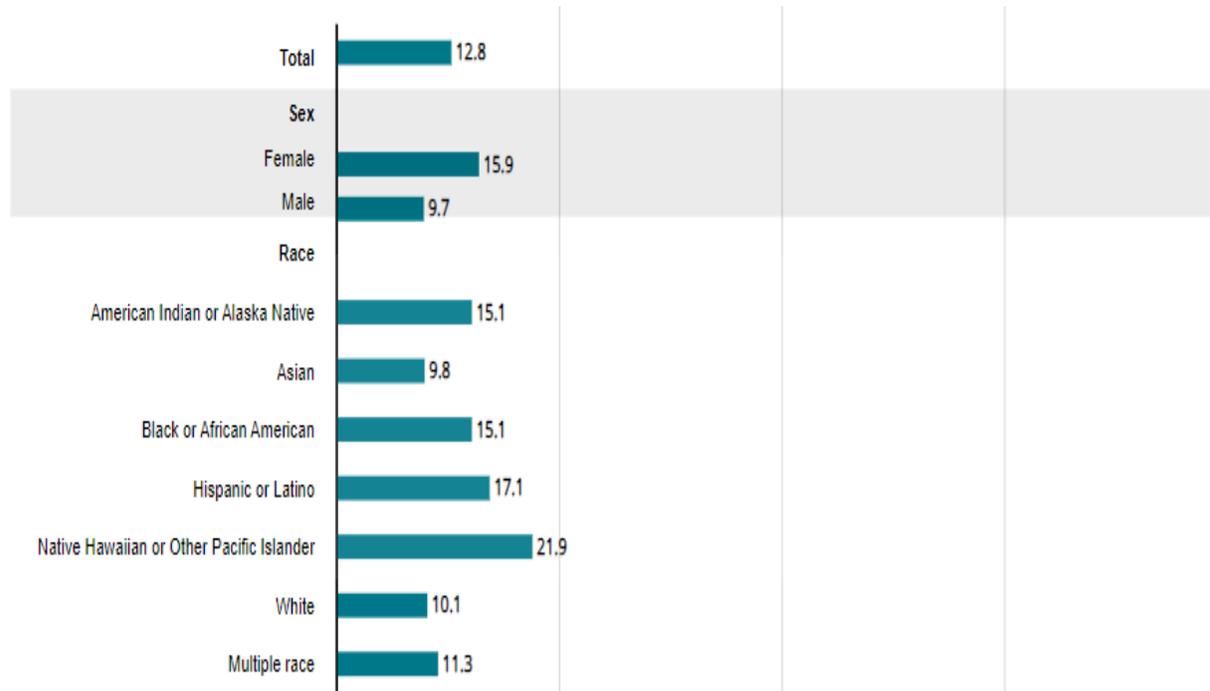


Descriptive Epidemiology – Understanding the What?



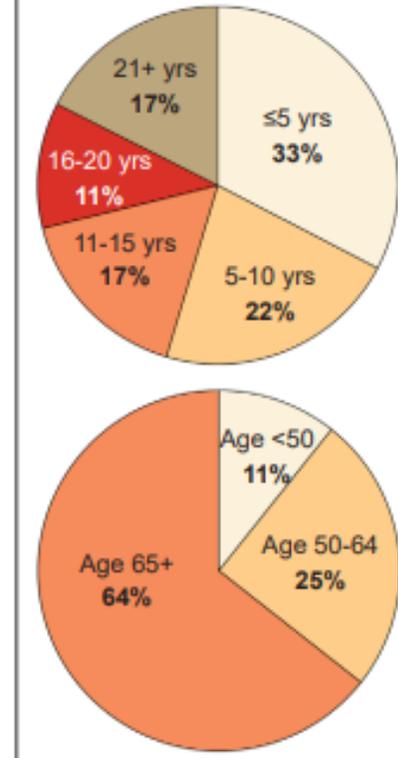
Person

High School Students Who Did Not Go To School Because They Felt Unsafe at or on their way to/from School (US, 2023)



Centers for Disease Control and Prevention (CDC). 1991–2023 High School Youth Risk Behavior Survey Data. Available at <http://yrbs-explorer.services.cdc.gov/>.

Figure 1. Proportions of cancer survivors by time since diagnosis and current age



2025 Cancer in Iowa <https://shri.public-health.uiowa.edu/cancer-data/iowa-cancer-reports/>

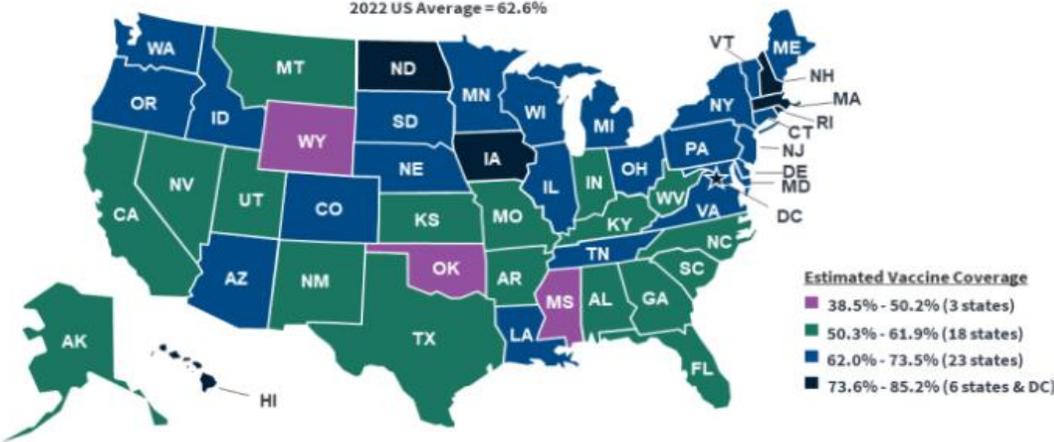
Place and Time

HPV Vaccination: Access and Use in the US

(KFF Women's Health Policy, 2024)

HPV Vaccination Rates of Adolescents by State

Adolescents Ages 13-17 with Up-to-Date (UTD) HPV Vaccination Series, 2022

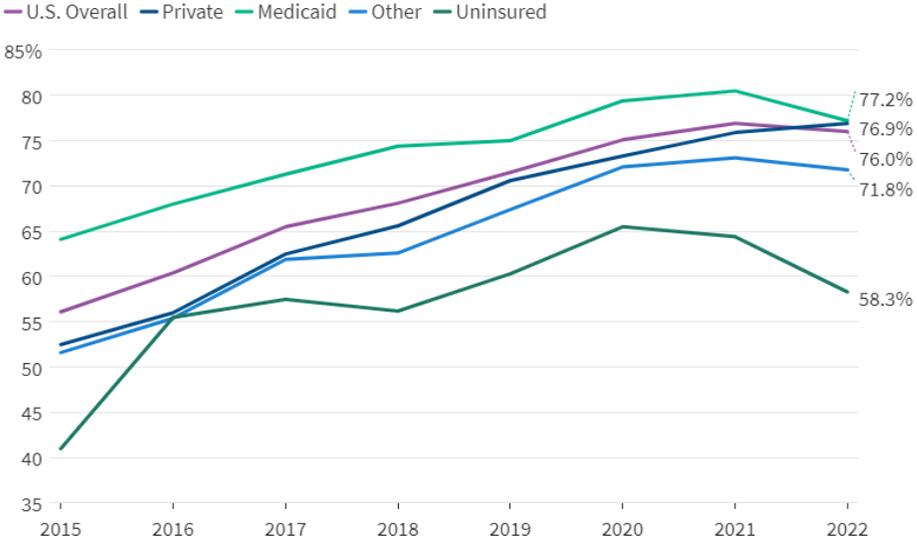


NOTE: HPV UTD includes those with ≥3 doses, and those with 2 doses when the first HPV vaccine dose was initiated before age 15 years and there was at least 5 months minus 4 days between the first and second dose.
SOURCE: CDC, Vaccination Coverage Among Adolescents Aged 13-17 Years – National Immunization Survey – Teen, United States, 2022. MMRW 72(34).

KFF

Rates of HPV Vaccine Initiation Among Adolescents Ages 13-17 in the U.S., by Insurance Status

Share of adolescents who have had at least one HPV vaccine, by insurance status, 2015-2022



Note: "Other" insurance includes the Children's Health Insurance Program, military insurance, Indian Health Service, and any other type of health insurance not mentioned elsewhere.
Source: SUPPLEMENTARY FIGURE 1. Vaccination Coverage Among Adolescents Aged 13-17 Years – National Immunization Survey-Teen, United States, 2022. MMRW 72(34);

Context, Context, Context



Stacked Bar Charts

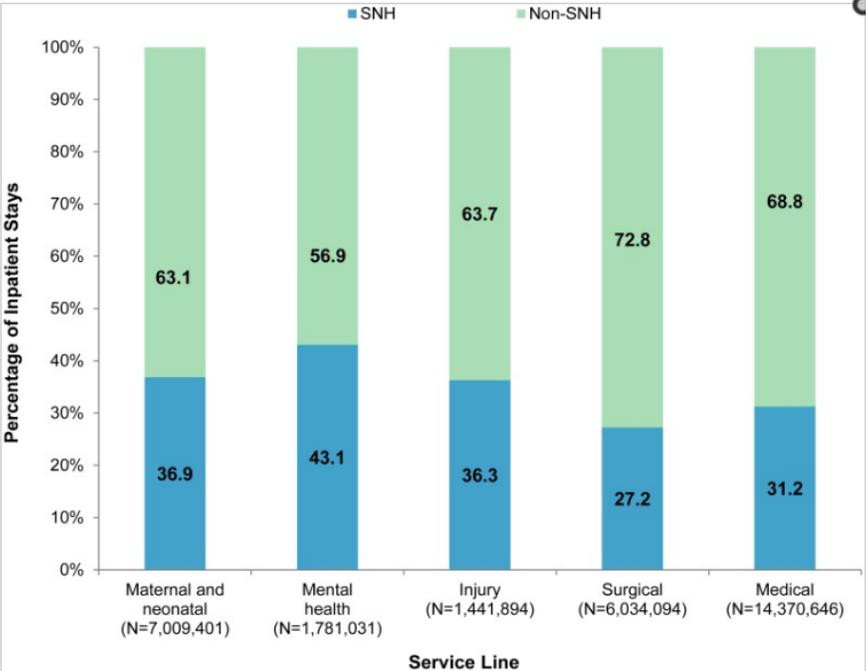


Figure 2 Percentage of inpatient hospital stays that occurred at SNHs and non-SNHs by service line in 40 States, 2014

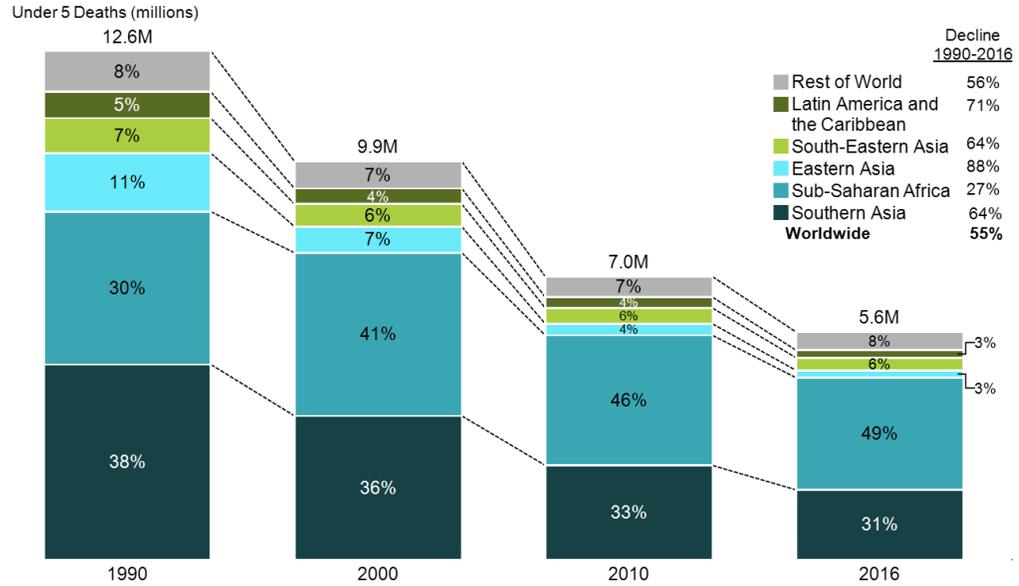
Abbreviation: SNH, safety-net hospital

Note: SNHs were defined as those with a percentage of Medicaid and uninsured discharges in the top quartile within the State.

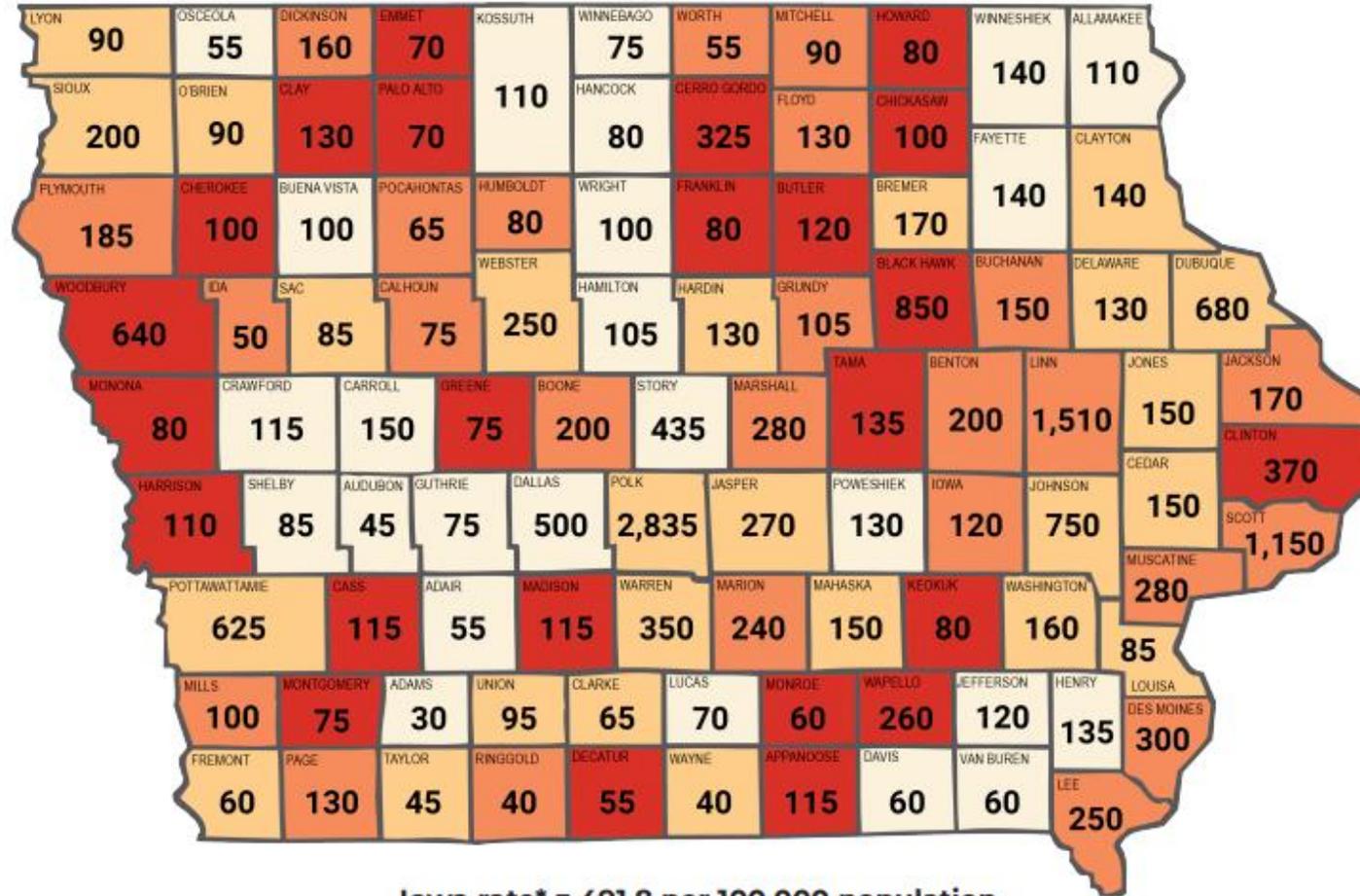
Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 40 States, 2014

Worldwide Decline in Child Mortality

Deaths in children under 5 have declined 55% worldwide from 1990-2016. In 2016, 80% of the 5.6M deaths occurred in Sub-Saharan Africa and Southern Asia.



Maps -Cancer in Iowa



Color reflects incidence rate for 2017-2021; Number is est new cases in 2025

Iowa rate* = 491.8 per 100,000 population

□ 396.9-466.9 (lowest rates in state)	□ 467.8-492.3 (includes state rate)	□ 493.8-513.6 (greater than state rate)	■ 514.1-580.0 (highest rates in state)
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*Rates are age-adjusted and per 100,000 population, 2017-2021

2025 Cancer in Iowa
<https://shri.public-health.uiowa.edu/cancer-data/iowa-cancer-reports/>



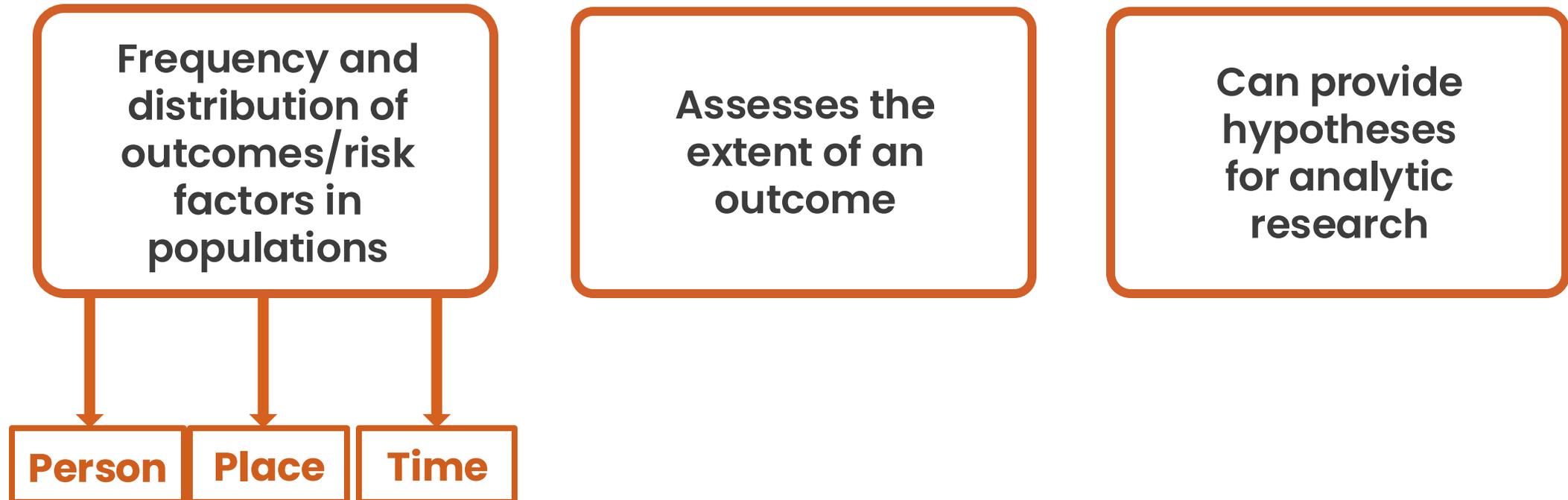
Module 3 – Part 1

Learning Objectives

1. Describe advanced descriptive epi aspects of a dataset for your primary audience
2. Visualize relationships between variables and comparisons (comparisons between groups, pre/post evaluation, etc)
3. Create advanced descriptive epi visualizations for your data in Excel



Descriptive Epidemiology – Understanding the What?



Module 3 Part 2

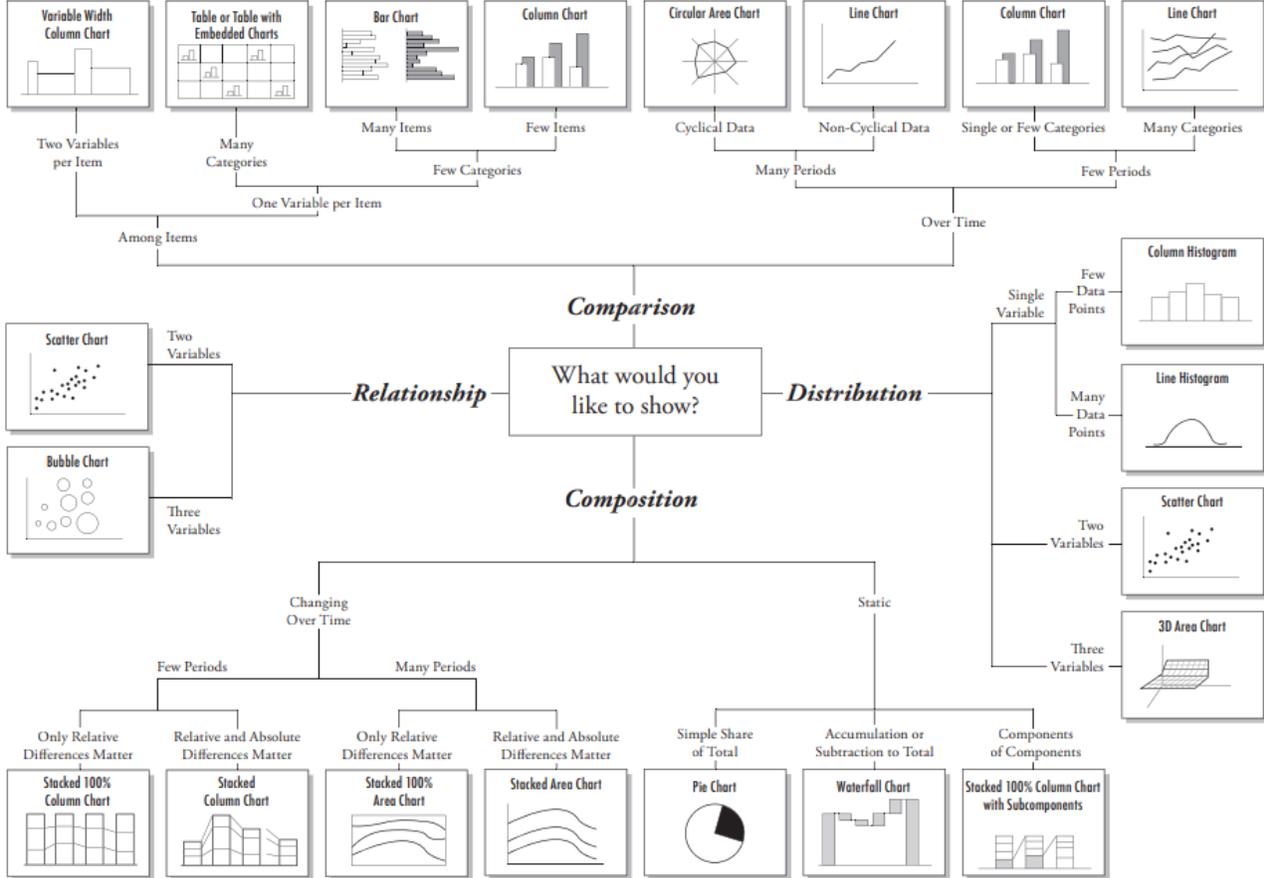
More Advanced Graph/Chart Types for Descriptive Epi Data

- Scatterplots
- Treemaps
- Pre/Post Evaluation
- Time Trend



What is the Purpose of This Visualization?

Chart Suggestions—A Thought-Starter

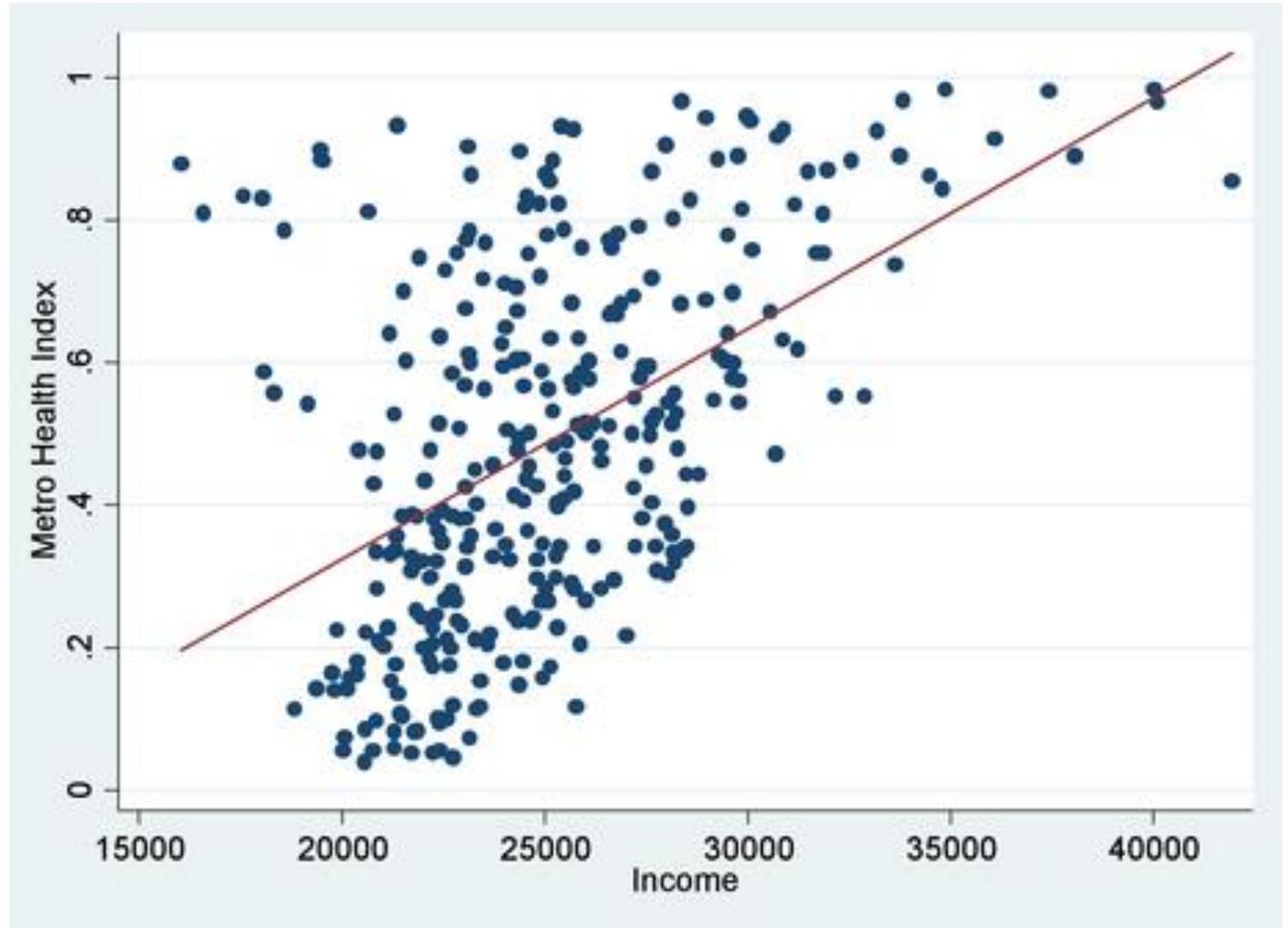


www.ExtremePresentation.com
© 2009 A. Abela — a.v.abela@gmail.com



**Scatterplots
allow you to
show
relationship/
correlation
between two
variables.**

But remember—Correlation is not
Causation!! (Scatterplots are best used
for Exploration of Relationships)



Stacked Bar Charts (Composition)

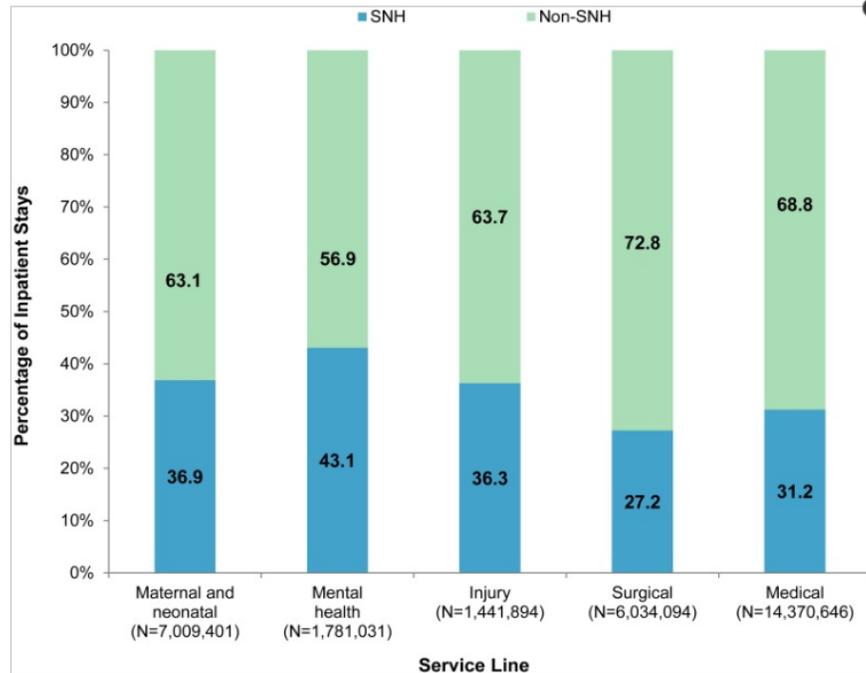


Figure 2 Percentage of inpatient hospital stays that occurred at SNHs and non-SNHs by service line in 40 States, 2014

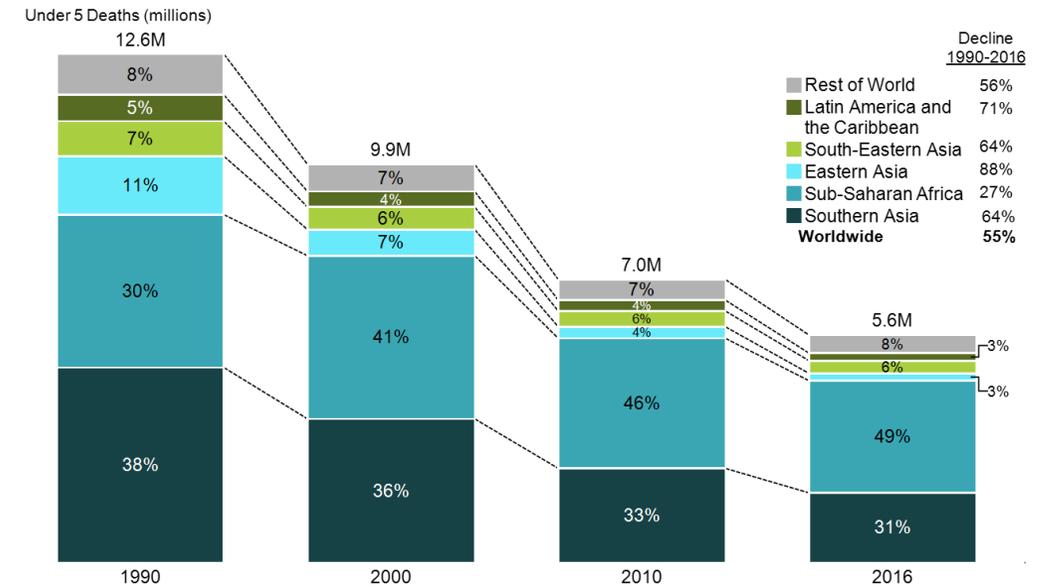
Abbreviation: SNH, safety-net hospital

Note: SNHs were defined as those with a percentage of Medicaid and uninsured discharges in the top quartile within the State.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 40 States, 2014

Worldwide Decline in Child Mortality

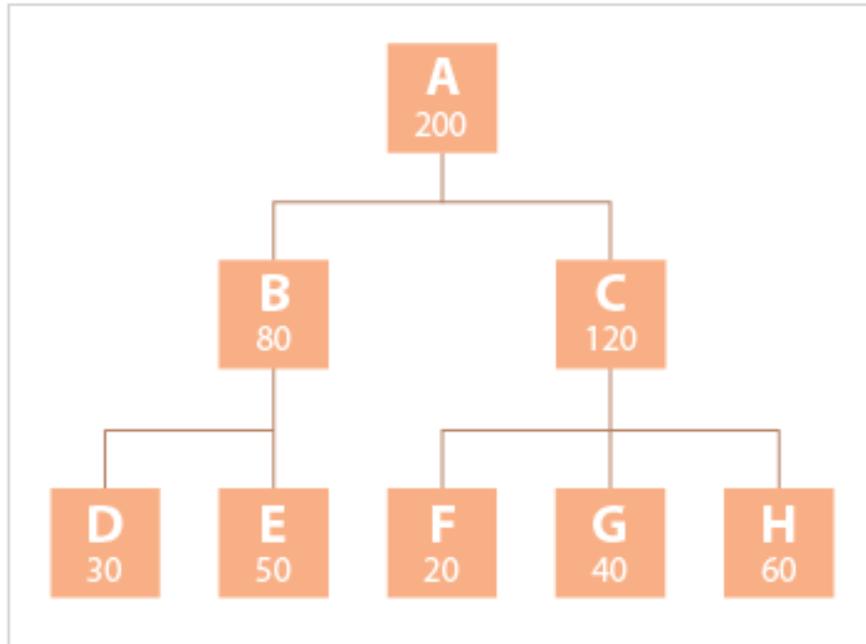
Deaths in children under 5 have declined 55% worldwide from 1990-2016. In 2016, 80% of the 5.6M deaths occurred in Sub-Saharan Africa and Southern Asia.



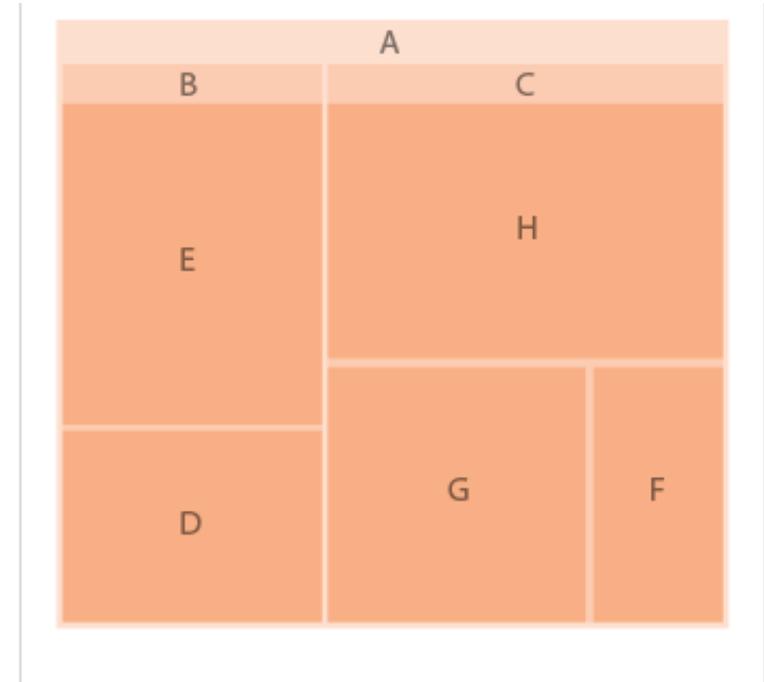
Treemap – Describe the Population That You Serve/Study (Composition)



Which One Will Work for Your Audience?



?

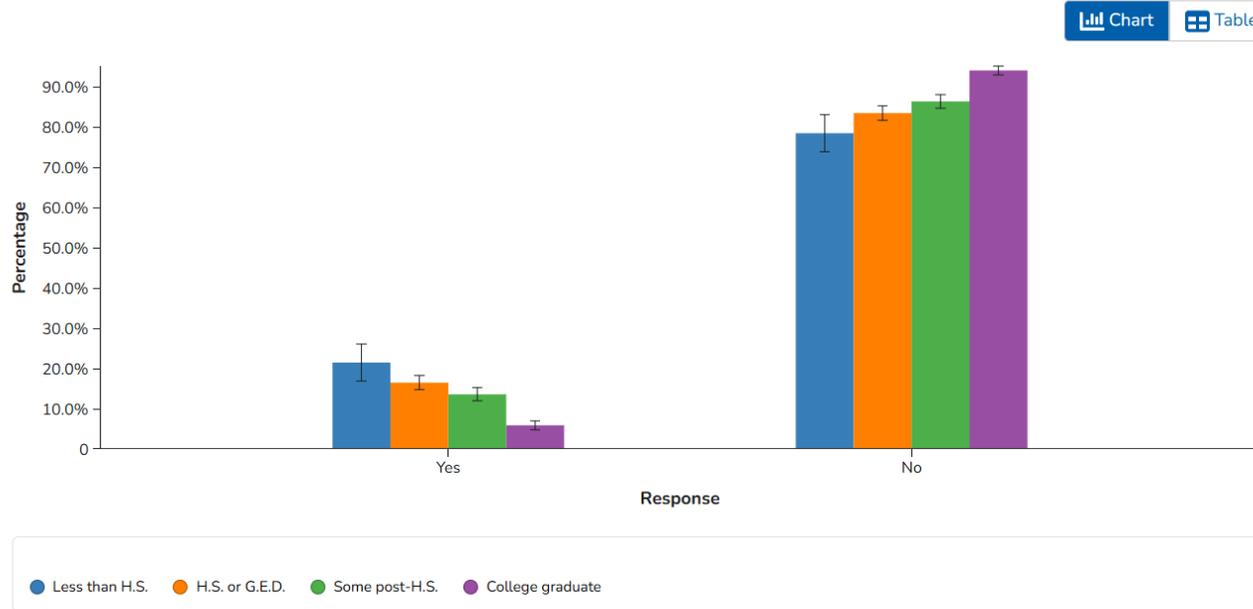


Bar Chart (Comparison)

Tobacco Use: Current Smoker Status

View By: Education Attained
 Data Type: Crude Prevalence

2024, Iowa



Data Source: [Behavioral Risk Factor Surveillance System \(BRFSS\)](#)

Tobacco Use: Current Smoker Status

View By: Education Attained
 Data Type: Crude Prevalence

2024, Iowa

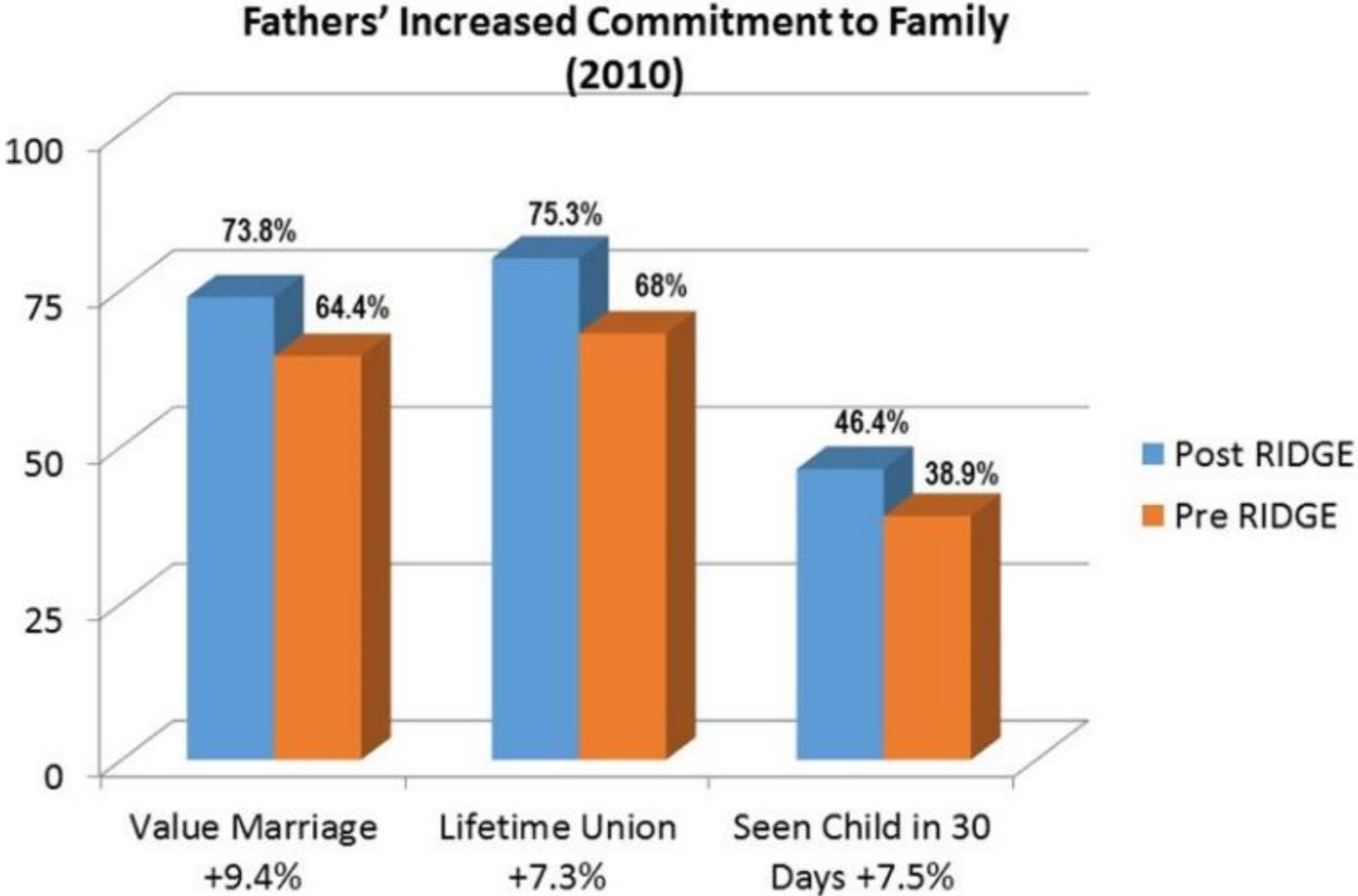
Chart Table

Education Attained	n	Percentage (%)	95% CI
Yes			
Less than H.S.	101	21.5	16.9-26.1
H.S. or G.E.D.	424	16.5	14.8-18.3
Some post-H.S.	344	13.6	12.0-15.3
College graduate	149	5.9	4.8-7.0
No			
Less than H.S.	431	78.5	73.9-83.1
H.S. or G.E.D.	2,163	83.5	81.7-85.3
Some post-H.S.	2,135	86.4	84.7-88.1
College graduate	2,519	94.1	93.0-95.2

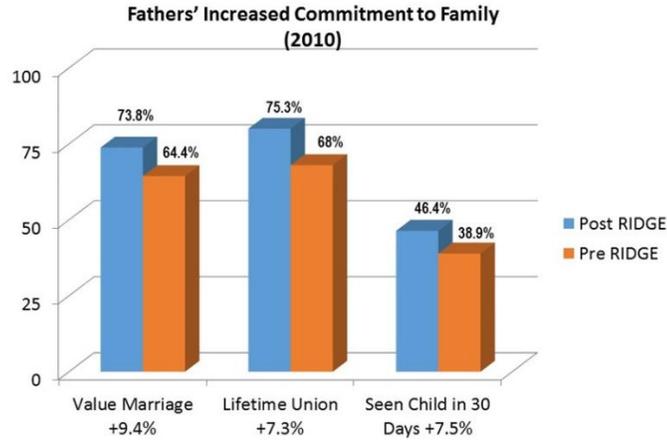
The ordering of subcategory rows in the table view may vary across responses.



Clustered Bar Chart – Pre/Post (Comparison)

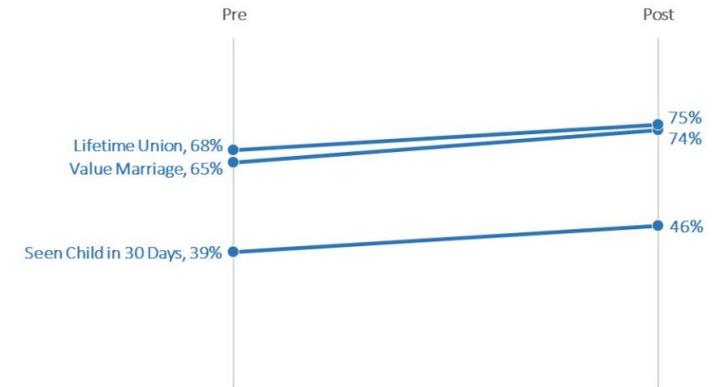


Different Chart Types-Pre/Post (Comparison)

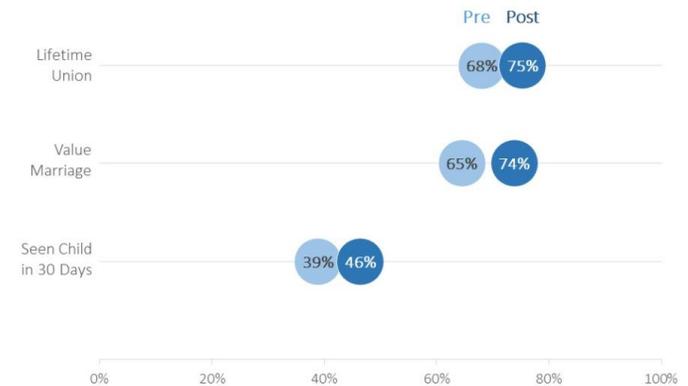


Fathers showed an **increased commitment to families**
Source: 2010 pre- and post-RIDGE data

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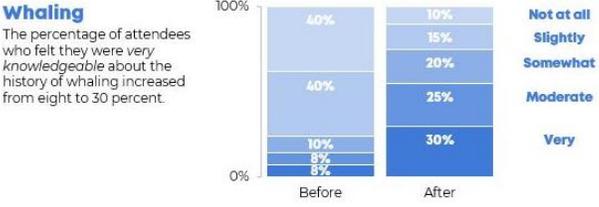
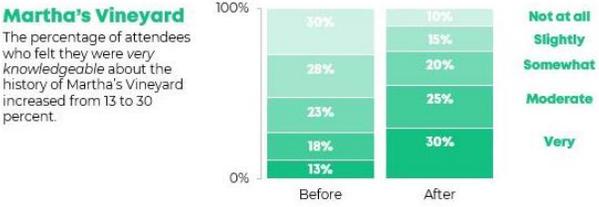
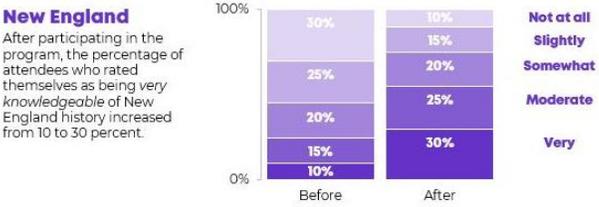


Stacked Bar Chart Pre/Post (Comparison)

Increased Historical Knowledge

We asked the 200 community members who enrolled in the ABC Museum Education program to describe their knowledge of these topics before and after the classes.

How knowledgeable are you about...?



Stacked Bar Chart Pre/Post (Comparison)

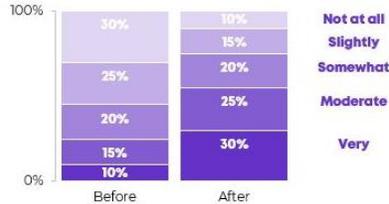
Increased Historical Knowledge

We asked the 200 community members who enrolled in the ABC Museum Education program to describe their knowledge of these topics before and after the classes.

How knowledgeable are you about...?

New England

After participating in the program, the percentage of attendees who rated themselves as being *very knowledgeable* of New England history increased from 10 to 30 percent.



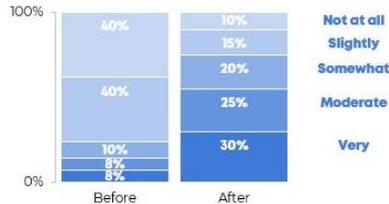
Martha's Vineyard

The percentage of attendees who felt they were *very knowledgeable* about the history of Martha's Vineyard increased from 13 to 30 percent.



Whaling

The percentage of attendees who felt they were *very knowledgeable* about the history of whaling increased from eight to 30 percent.



OR

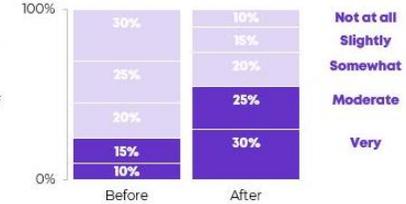
Increased Historical Knowledge

We asked the 200 community members who enrolled in the ABC Museum Education program to describe their knowledge of these topics before and after the classes.

How knowledgeable are you about...?

New England

After participating in the program, the percentage of attendees who rated themselves as being *very or somewhat knowledgeable* of New England history increased from 25 to 55 percent.



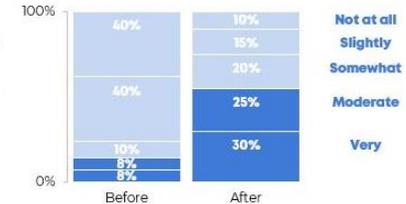
Martha's Vineyard

The percentage of attendees who felt they were *very or somewhat knowledgeable* about the history of Martha's Vineyard increased from 31 to 55 percent.



Whaling

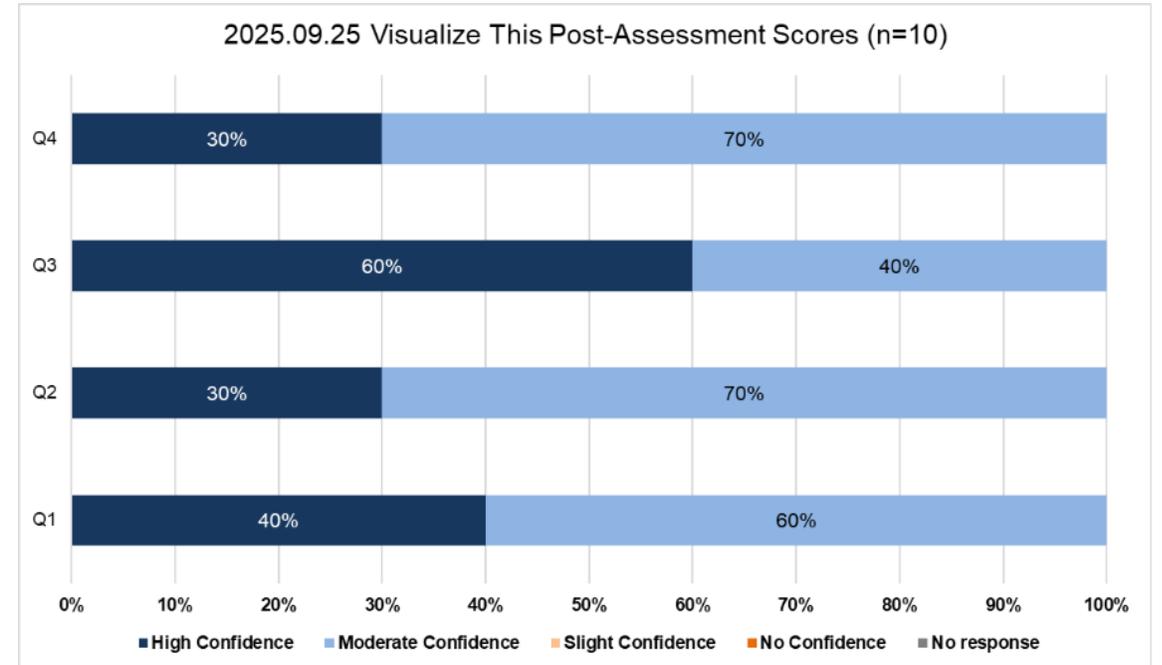
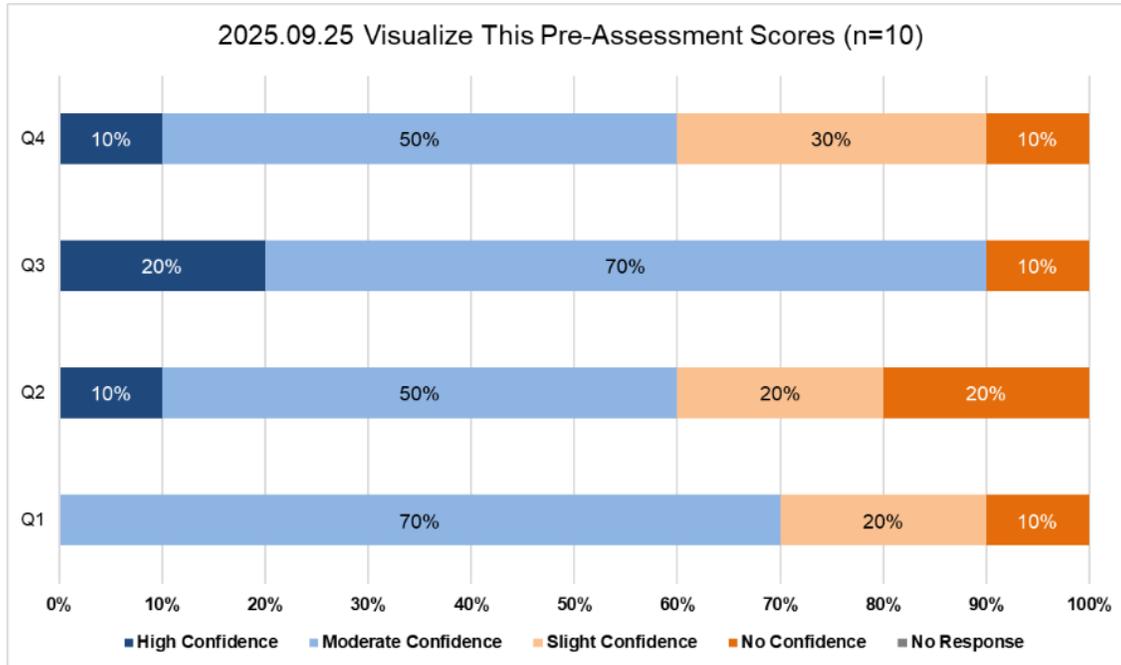
The percentage of attendees who felt they were *very or somewhat knowledgeable* about the history of whaling increased from 16 to 55 percent.



Is This One Better? Why?



Stacked Bar Chart Comparison (Pre/Post)



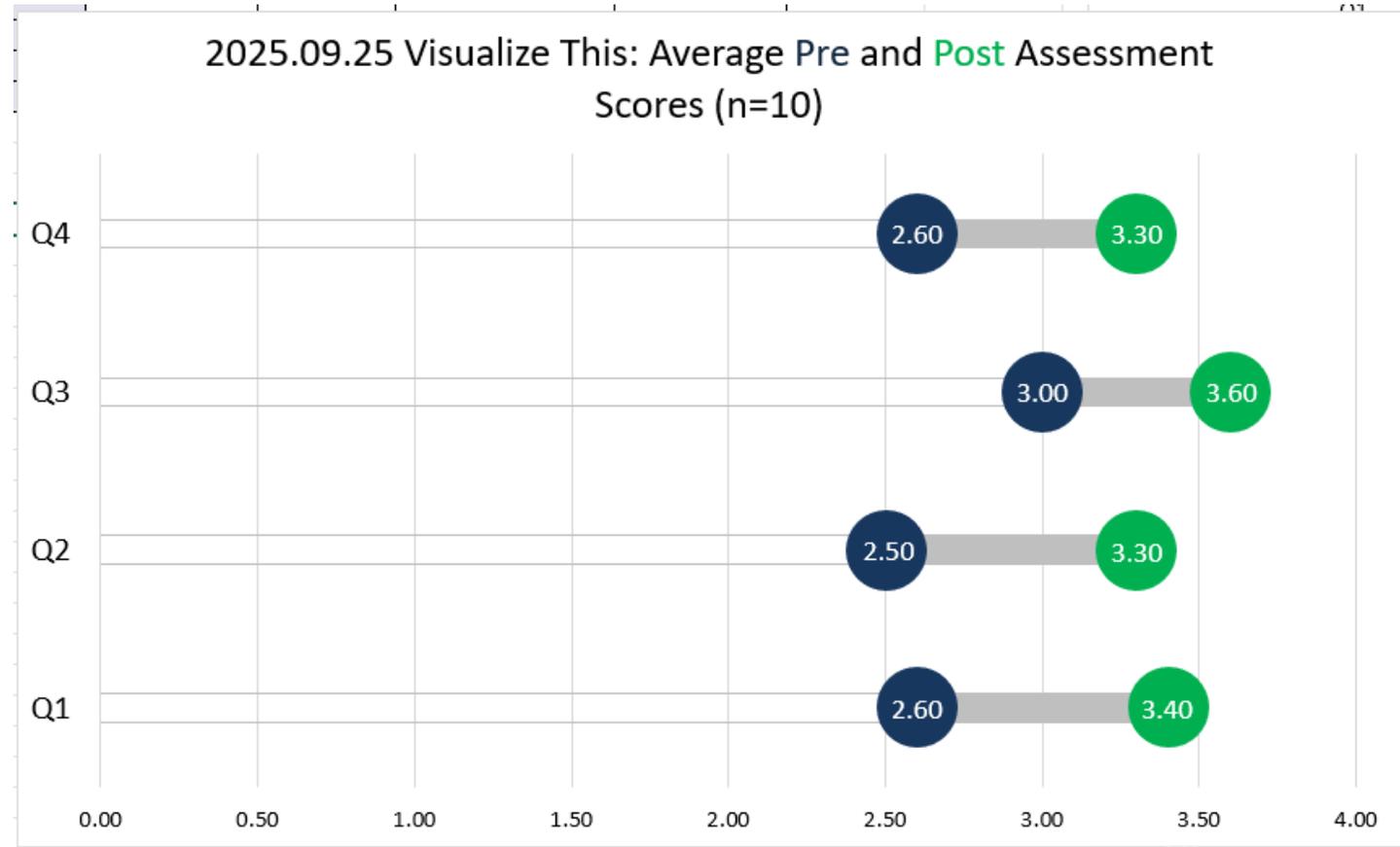
Instructions for how to make charts from evaluation data: [VT2 line](#), [stacked bar](#), and [map instructions](#)



Pre and Post Evaluation Dumbbell Chart

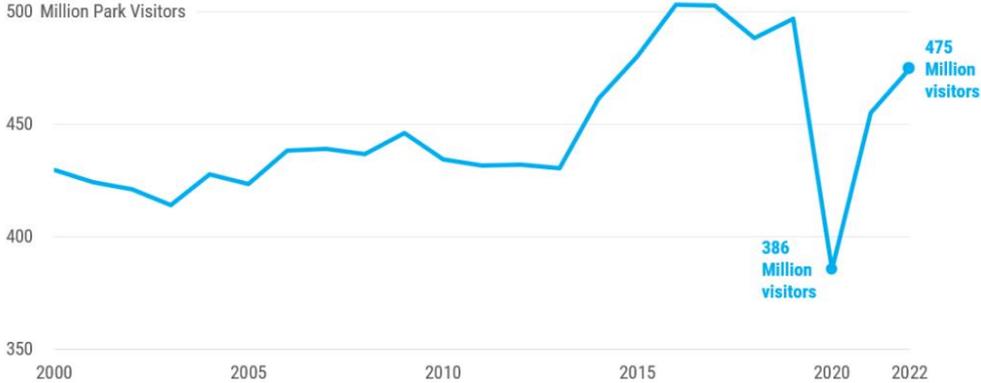
Instructions for creating a pre/post evaluation chart:
[VT2 Pre/Post Eval Instructions](#)

Directions to create this can be found here:
<https://stephanieevergreen.com/horizontal-dumbbell-dot-plots-easier/>



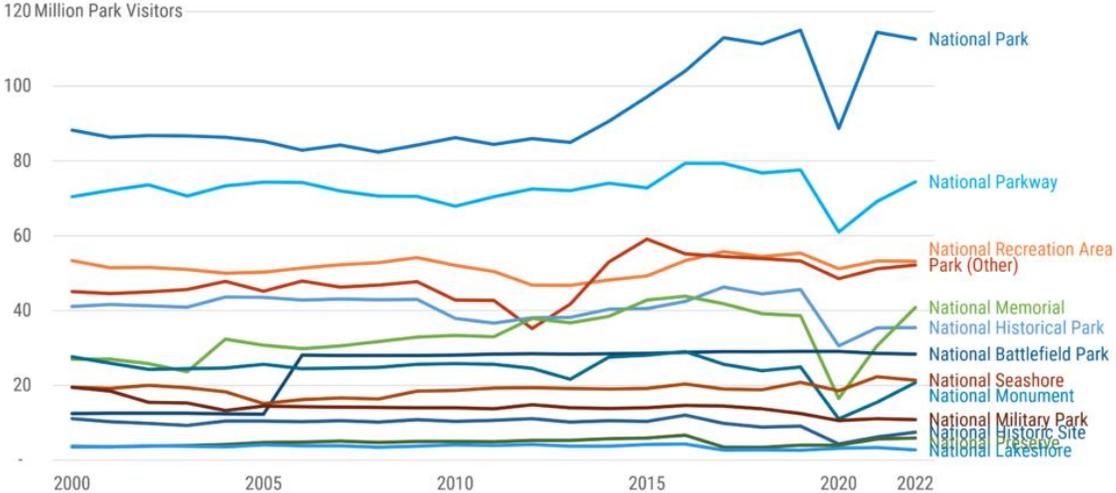
Time Trends

Visitation to US national parks has bounced back since 2020 and is now approaching pre-pandemic attendance levels.



Source: US National Park Service

US national park visitation by designated park type.

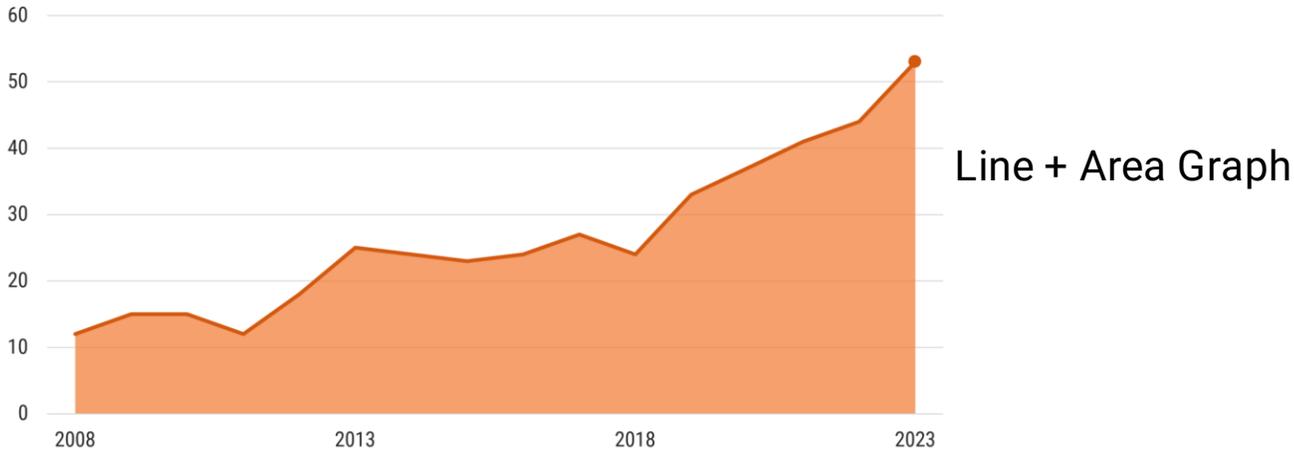


Source: US National Park Service



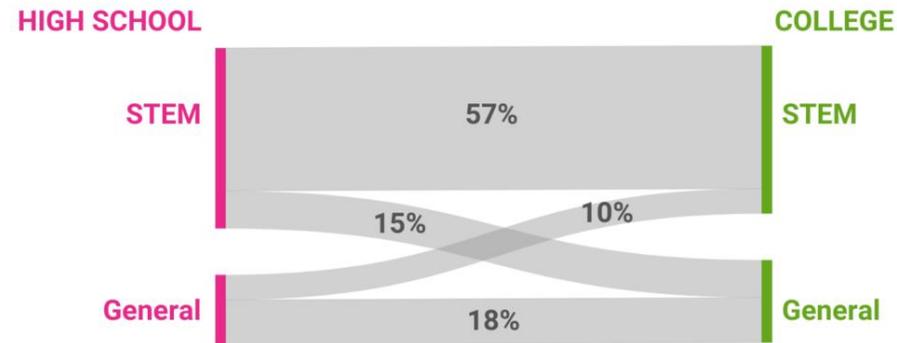
Other Ways to Show Change Over Time

The number of Fortune 500 female CEOs is on the rise!



Line + Area Graph

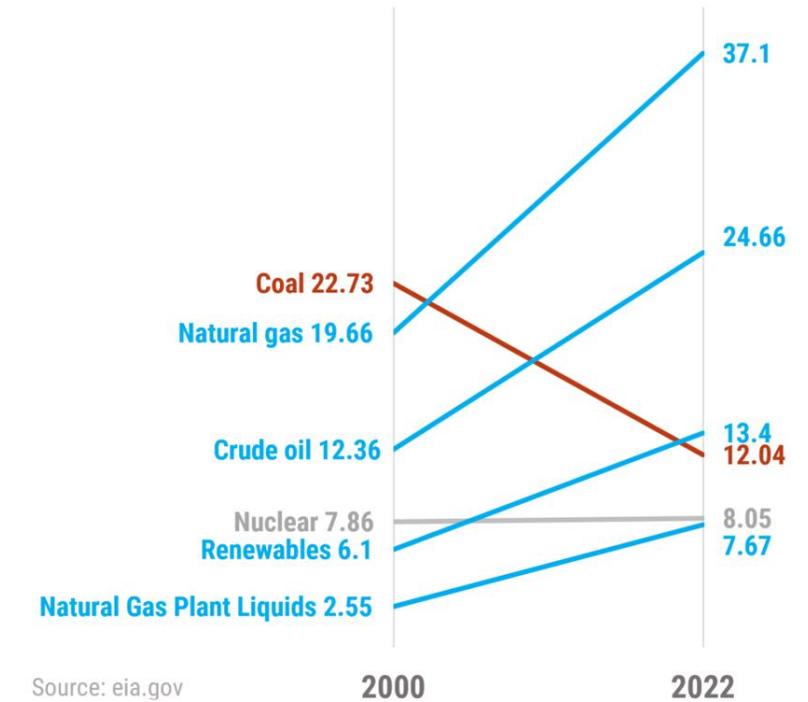
Surprisingly, 10% of the students who didn't focus on STEM in high school ended up choosing a STEM major in college.



Sankey Graph

Coal energy production in the US has declined over the last two decades while energy production from all other sources has increased.

Quadrillion British thermal units



Source: eia.gov

Slope Graph



Good charts vs. Bad charts

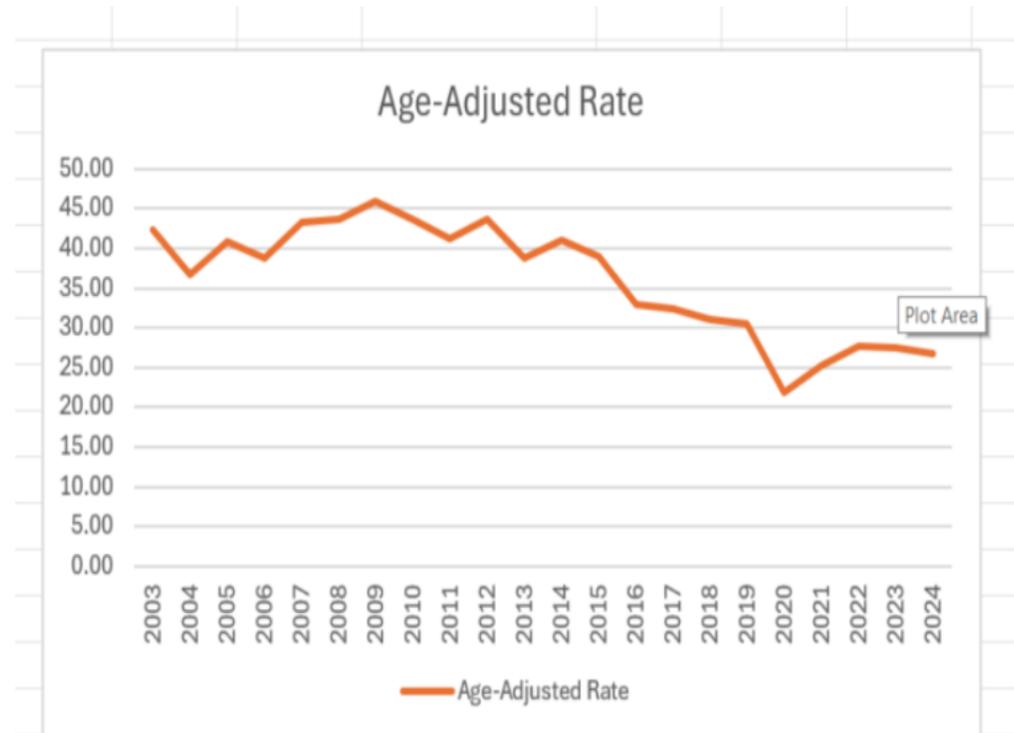
The Elements of Chart Design

- Text
- Arrangement
- Color
- Lines
- Overall attributes
- Incorporating People-Centeredness



Data Elements– Using VT1 Asthma Line Chart Example

This example explains how to add data elements to a chart. To add a new chart title, click on the title until you see the I-beam pointer that allows you to type and add text. Change the title to “Asthma ED Visits Time Trend.”

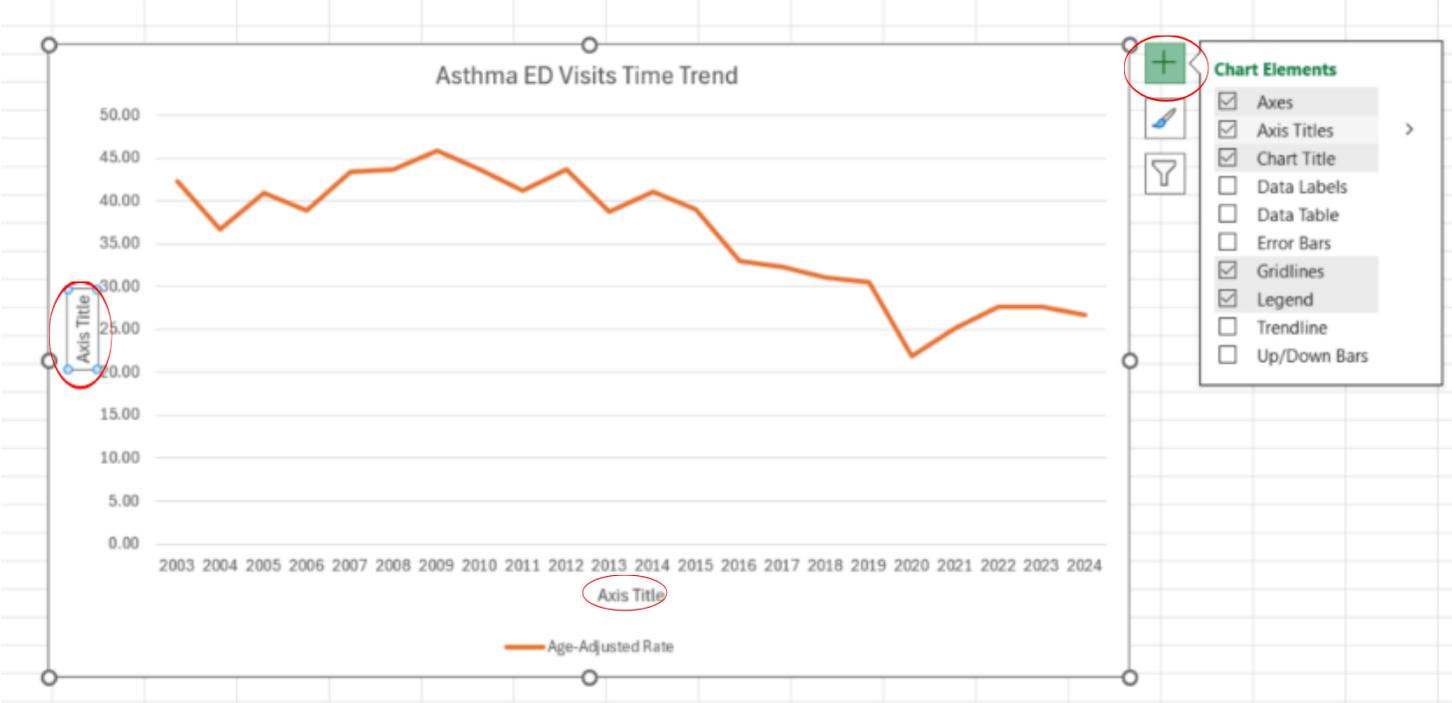


*** How to get the data and create chart – [VT1 Example](#)



Data Elements– Using VT1 Asthma Line Chart Example

To add axis titles, click the green plus sign at the top right corner of the chart. This button is called the “Chart Elements” button. Once the chart elements menu is opened, click to check the box next to the “Axis Titles” option. You can see from the picture below that axis titles have been added to the left and bottom of the chart.

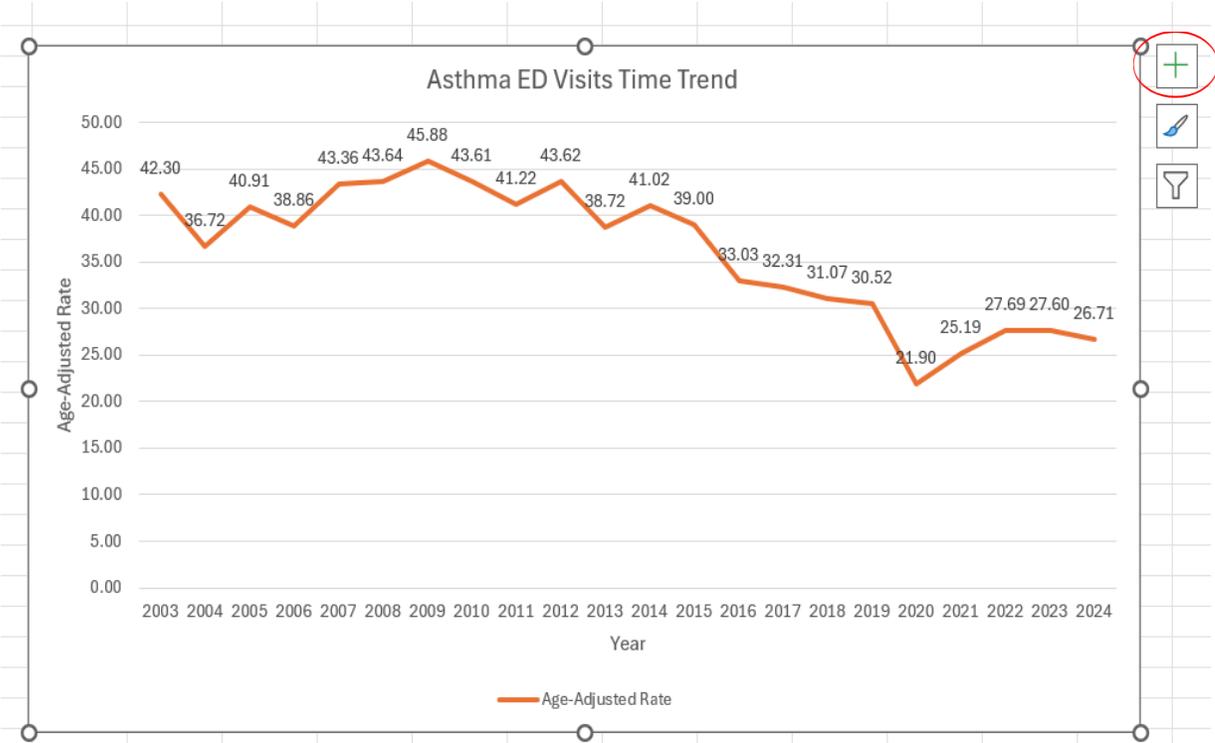


To change the axis titles, click on them like we did with the chart title. Change the Y-axis title to “Age-Adjusted Rate” and the X-axis title to “Year.”



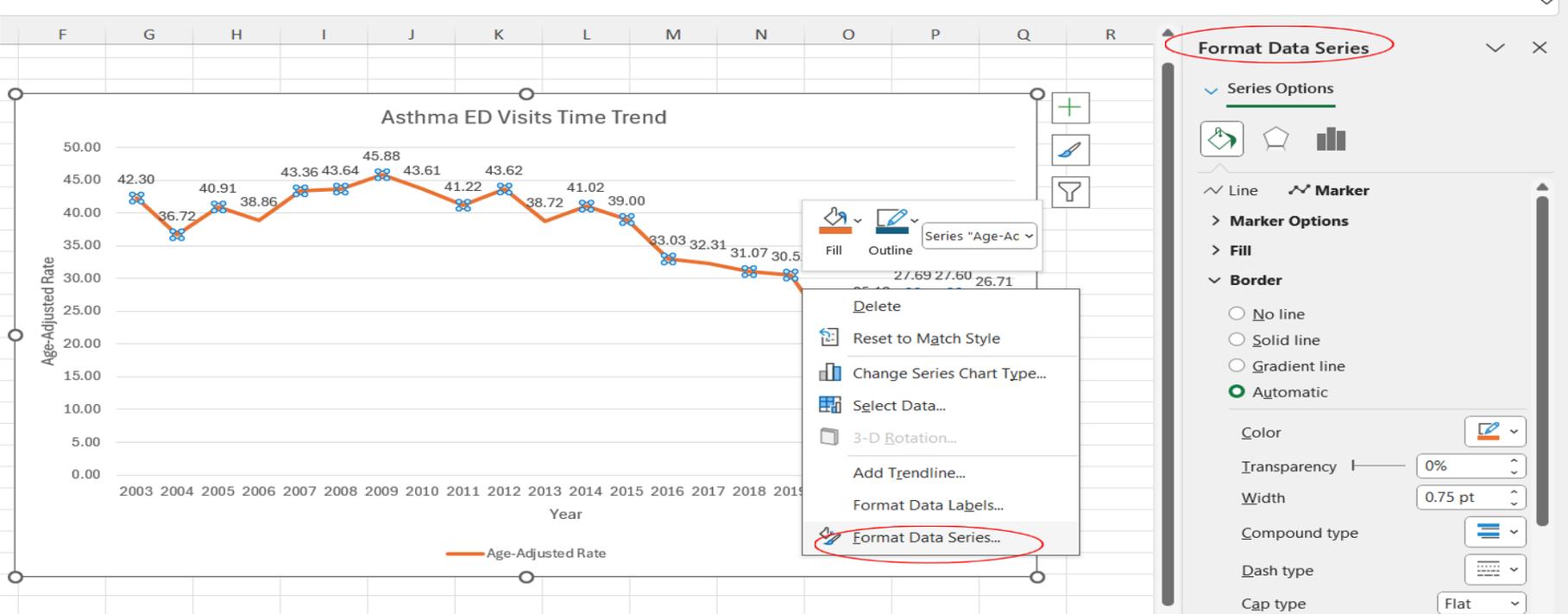
Data Elements– Using VT1 Asthma Line Chart Example

To add data labels to the chart, click the chart elements button and select the Data Labels option. The Data Labels should look like this:



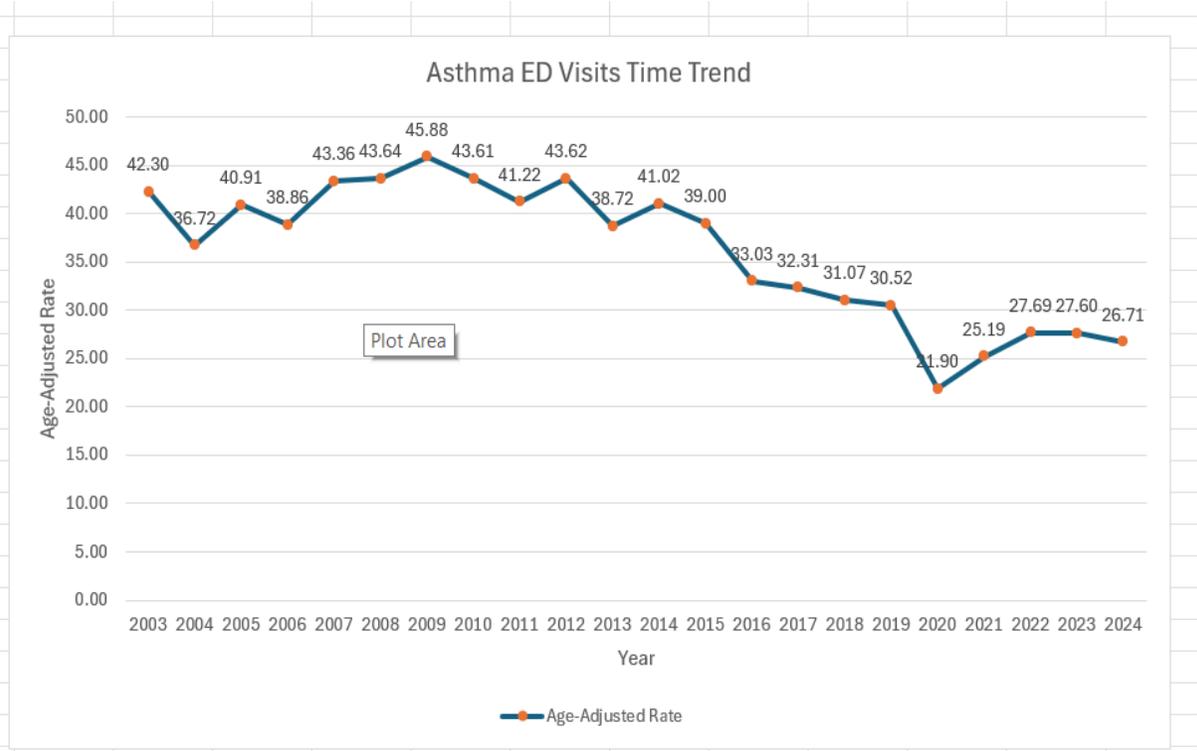
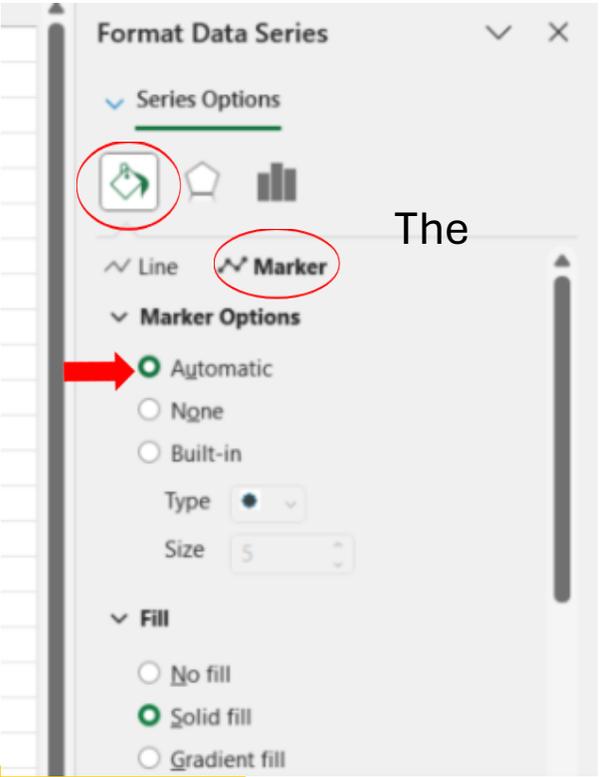
Data Elements– Using VT1 Asthma Line Chart Example

Additionally, we can add markers to the line to make it easier to see what data point corresponds with what year. Right click on the trendline and then click the bottom option that says, “format data series.” This will open a menu on the left side of the screen.



Data Elements– Using VT1 Asthma Line Chart Example

In the “format data series” menu, click on the paint bucket icon under series options, under the paint bucket select the marker icon, and then under “marker options” choose automatic.

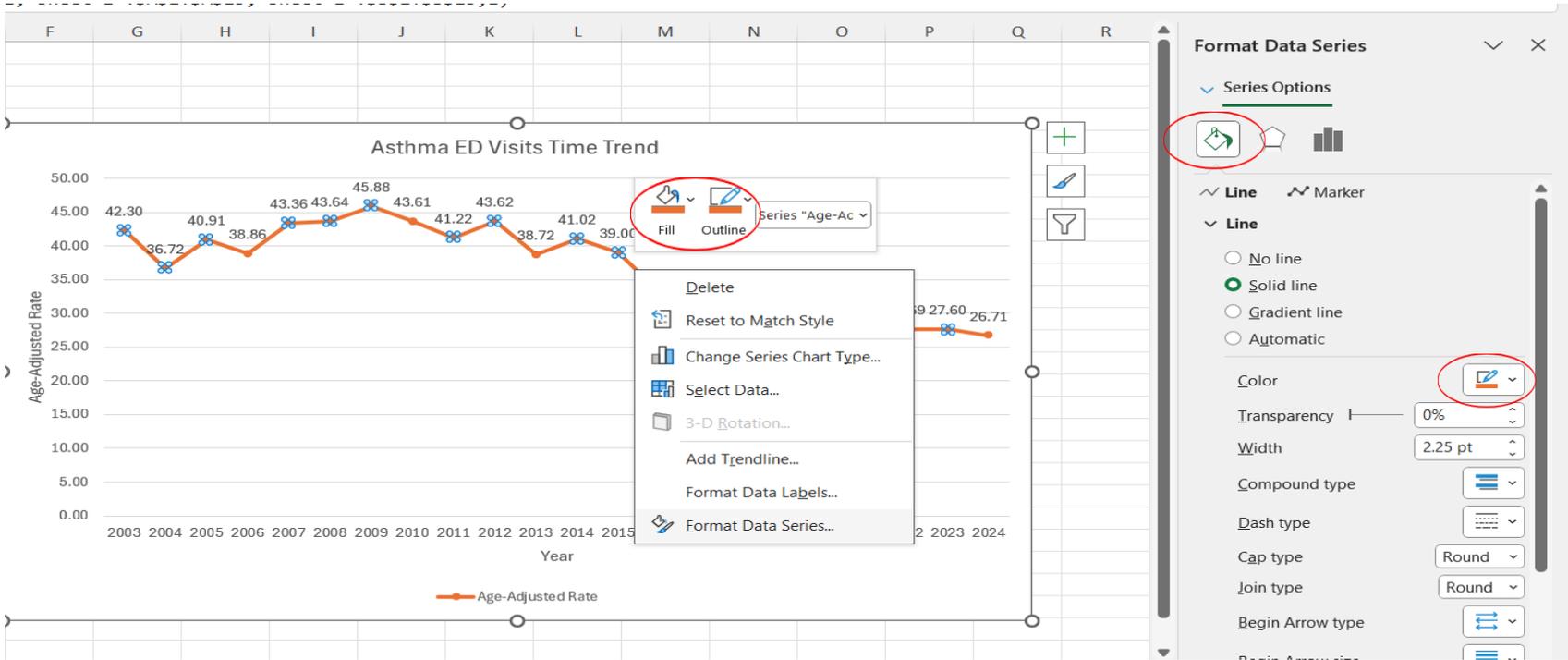


The markers should look like this on the chart.



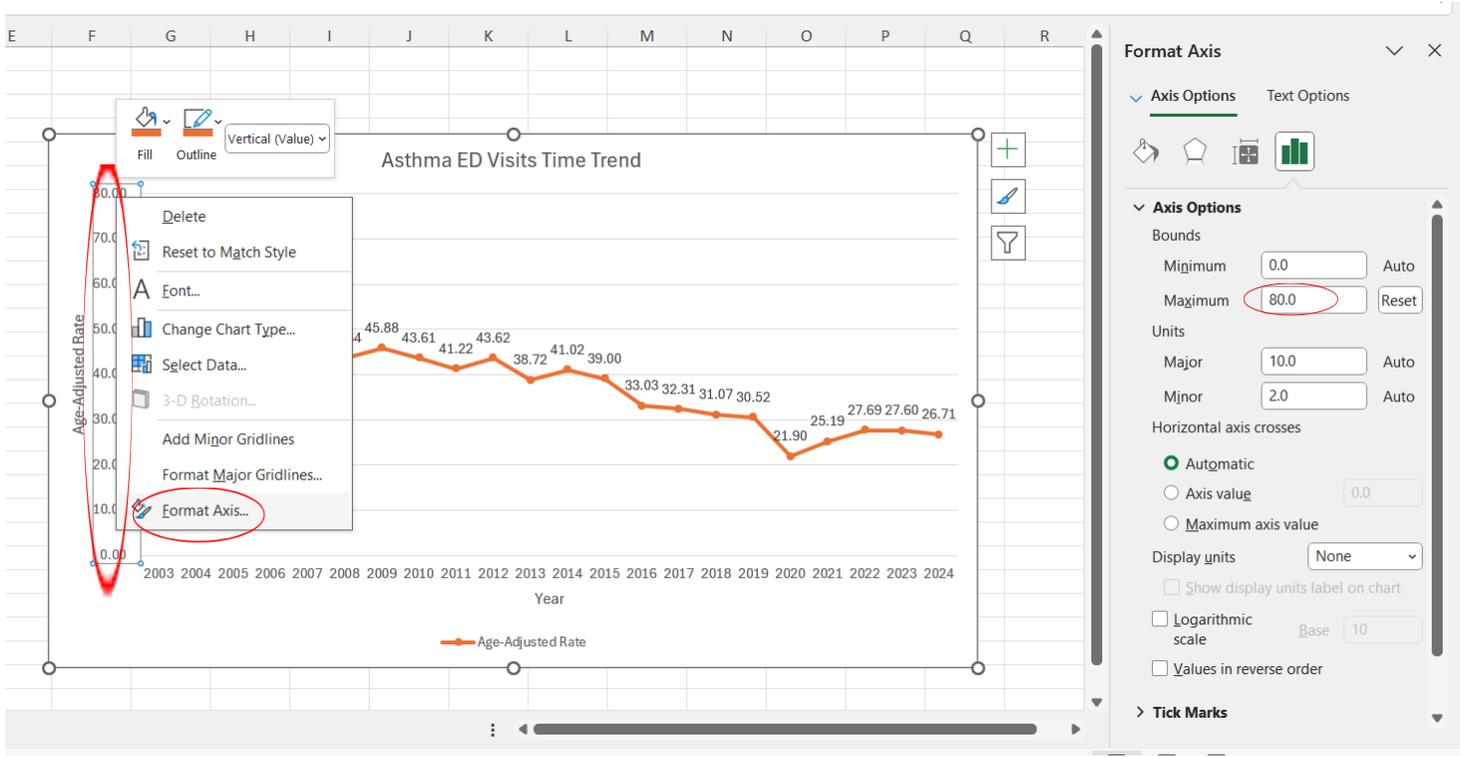
Data Elements– Using VT1 Asthma Line Chart Example

To change the color of the line and markers, click on the line, and above the menu that pops up, you should see a shortcut where you can change the fill and the outline of the line on the chart. Additionally, you can also change the color, and other aspects of the line such as the width, by opening the “Format Data Series” menu and selecting the paint bucket.



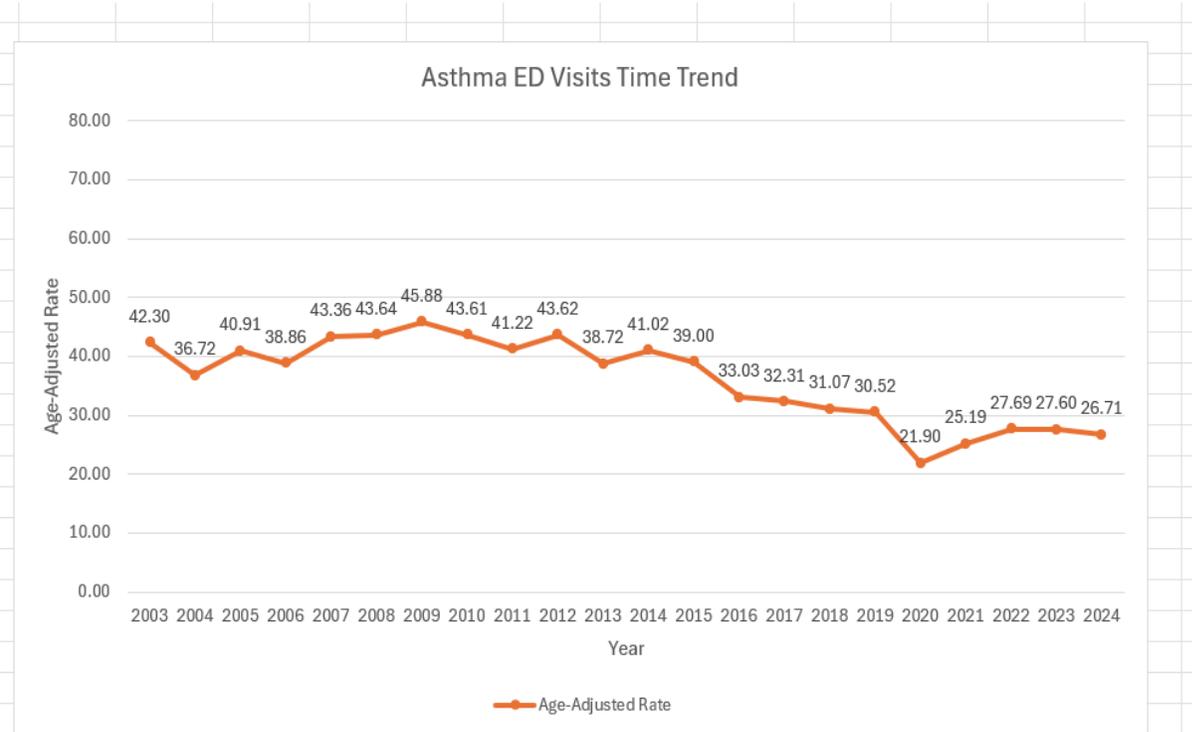
Data Elements– Using VT1 Asthma Line Chart Example

Lastly, to change the scale of the y-axis, right click on the axis numbers and then click “Format Axis.” A similar side menu will appear, and then the minimum and maximum numbers on the y-axis can be changed. Change the maximum value to 80.



Data Elements– Using VT1 Asthma Line Chart Example

Here is our chart after all the above adjustments have been made. There are many more aspects of this chart that can be changed, for example, the decimal points can be shortened to make the numbers on the chart clearer, and the color and size of the text can be changed.



Our [Data and Surveillance Resources Webpage](#) includes more information and tutorials on how to make changes like this in Excel.



How To Add Context to Your Chart/Graph

Adding “Higher is Better”
Context for Dynamic Dashboards

The image shows a woman with long brown hair, wearing a dark blue top, holding a laptop. The laptop screen displays a dashboard with two bar charts. The left chart is blue and the right chart is green. There are yellow circles highlighting parts of the dashboard. A green Excel icon is in the bottom left. The background is purple.

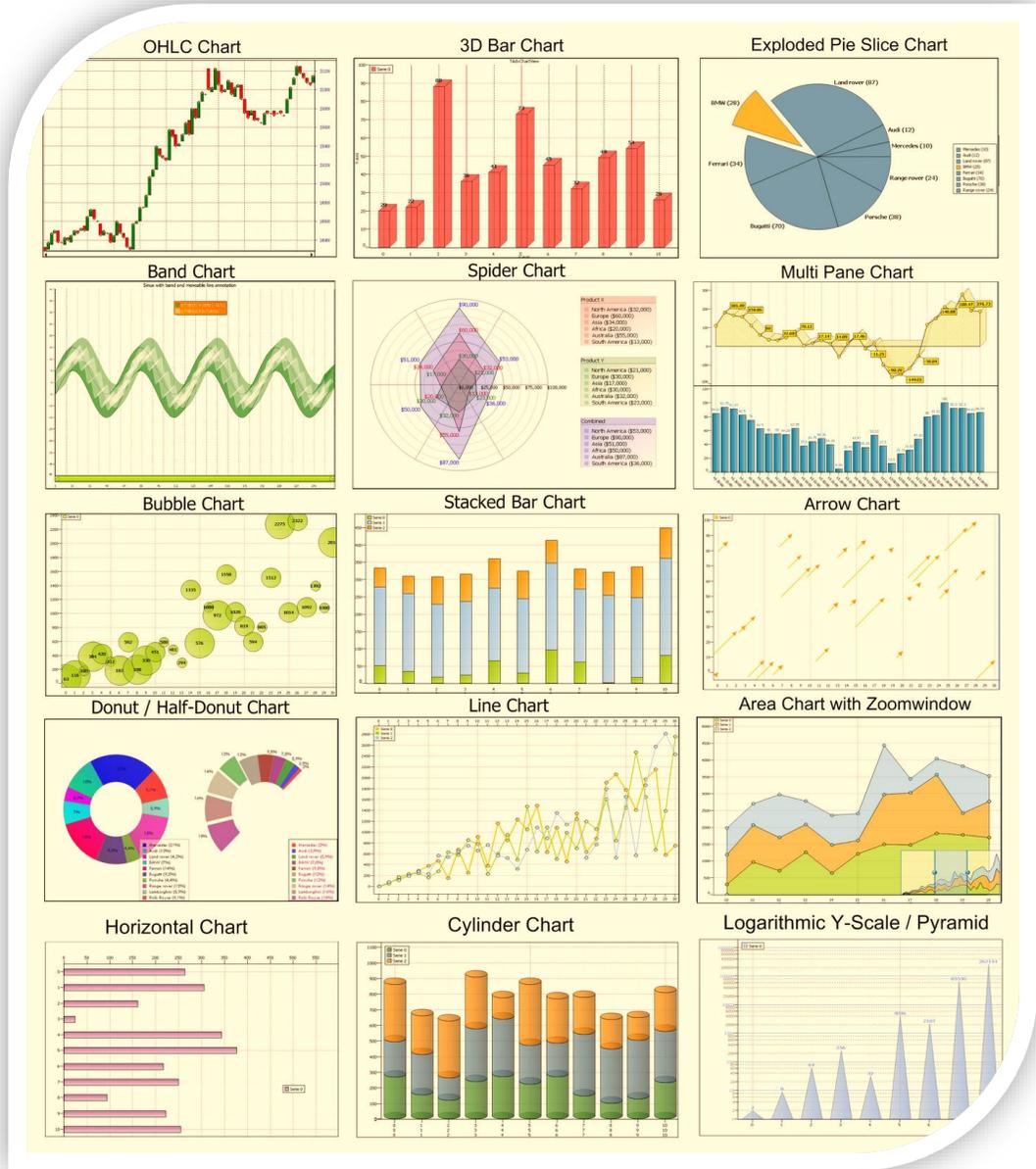
Ann Emery DepictDataStudio.com

IOWA

Institute for Public Health Practice, Research and Policy



Data visualization – the representation of information in the form of a chart, graph, picture, etc.



Questions?



Homework Assignment: Create Your Visualization

Using the feedback that you received from group members on the rough sketch of your data visualization as well as the tools you learned about in modules 2 & 3, **create your data visualization**

You will share your visualization with your breakout group during live learning session 4 and will later have the opportunity to receive feedback from course instructors.



Resources

- Stephanie D.H. Evergreen, Effective Data Visualization, 2nd edition 2020
- Using Graphics to Report Evaluation Results <http://learningstore.uwex.edu/assets/pdfs/G3658-13.PDF>
- Cole Nussbaumer Knaflic, Storytelling with Data: a data visualization guide for business professionals, Wiley, 2015
- <https://policyviz.com/product/core-principles-of-data-visualization-cheatsheet/>
- <https://coolinfographics.com/dataviz-guides>
- <https://www.urban.org/research/publication/do-no-harm-guide-applying-equity-awareness-data-visualization>
- Stephen Few Alberto Cairo Ann Emery Jon Schwabish Edward Tufte



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Thank you!

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Institute for
Public
Health
Practice,
Research
and Policy

