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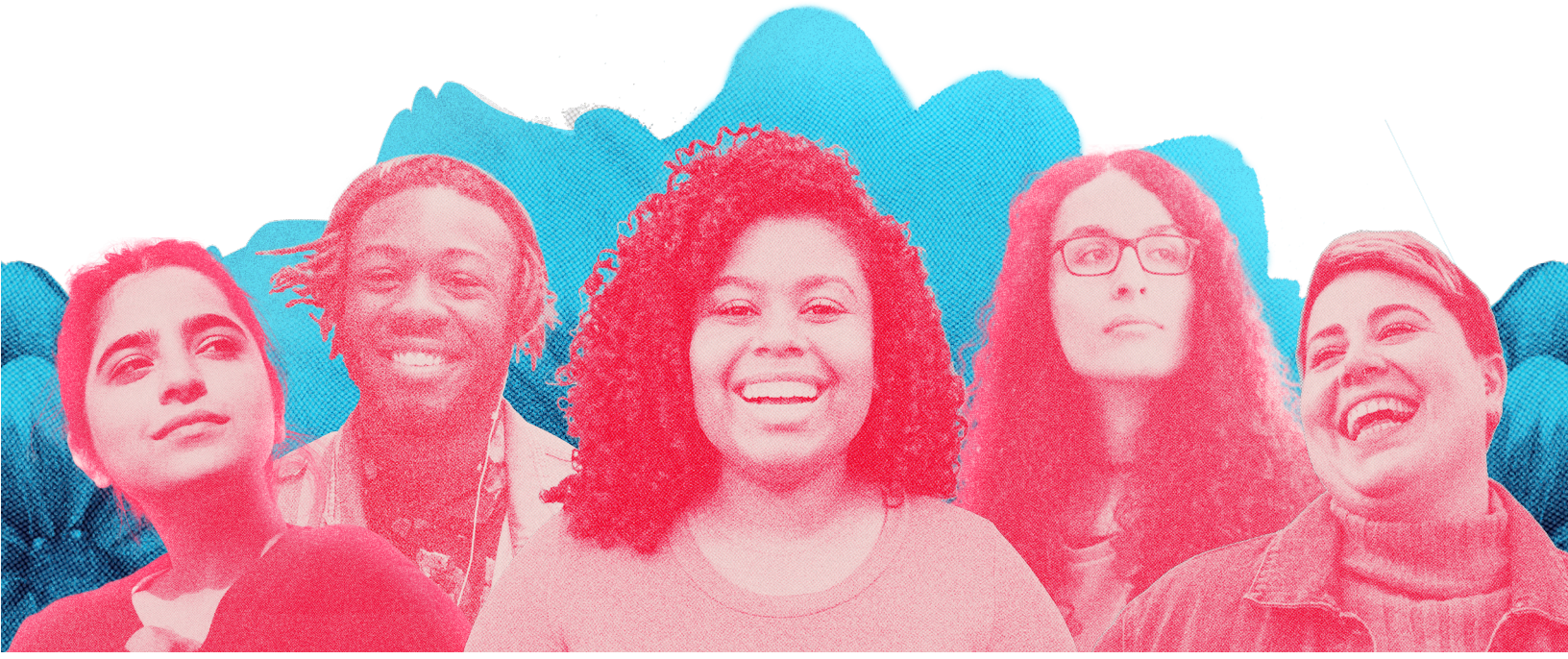
Numbers to Narratives

Using data to uplift stories, uncover needs, and build community readiness for healing-centered and inclusive sex ed



Data Storytelling Guide

Numbers to Narratives Data Storytelling Guide

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HealthyTeenNetwork.org

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Finally, we extend our heartfelt thanks to our Healthy Teen Network teammates, Gina Desidero and Bianca Devoto, for their invaluable support in identifying the direction of this resource and serving as a sounding board as ideas came to fruition.

About Thrivology

Every young person has a right to bodily autonomy and sexual health and well-being. To realize these rights, young people need access to sexual and reproductive health programs and services that are safe, honest, inclusive, affirming, healing-centered, and trauma-informed.

We see you—the teachers and educators, the counselors and clinicians, the caring adults—working hard every day to make this happen. With easy access to the latest research, along with practical, helpful opportunities and resources, we know you are better supported and able to provide young people with the very best care and education they deserve.

That's why Healthy Teen Network and Johns Hopkins Center for Adolescent Health have partnered to create Thrivology.

Thrivology creates resources using the latest research on how to provide the very best sexual and reproductive health education and care, so young people may thrive.

Thrivology is a U.S. Health and Human Services Office of Population Affairs-funded research-to-practice center. In collaboration with our Research Alliance of experts in the field and Thrivology Youth Leaders, we work to expand the delivery of trauma-informed, healing-centered, and inclusive practices in adolescent sexual and reproductive health programming and care.

Learn more on our website, healthyteennetwork.org/thrivology/

About Healthy Teen Network

We are Healthy Teen Network.

We believe every young person has the right to be who they are and love who they love.

That means living in a world that affirms and celebrates them for who they are. That means having the agency, opportunity, and access to make decisions about their bodies, relationships, and futures. (And feel good doing it!) That includes decisions about if, when, and how to parent—or not.

And we see you—teachers and educators, counselors and clinicians, caring adults—helping them do this. Every day, providing honest, affirming care and education, and empowering the next generation to lead healthy, fulfilling lives.

At Healthy Teen Network, we know you do your best when you're connected to great opportunities, resources, and others working in sexual and reproductive health. That's the magic of the Network—and why we're here every day to help professionals learn, improve, create, and advocate.

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Preface

About Numbers to Narratives

Numbers to Narratives workshops act as a first step in increasing your community's readiness for implementing healing-centered and inclusive sex ed in your schools.

When it comes to advancing adolescent sexual and reproductive health and well-being, you want all the support you can get. But how do you build community support?

Whether you're facing policy restrictions, concerns from families, a lack of prioritization for sex ed, or other challenges, Numbers to Narratives workshops get the conversation started and help you to gain buy-in for healing-centered and inclusive sex ed. Leading these workshops in your community can help you build support by uplifting adolescent health data and stories.

This process uses a healing-centered and inclusive lens by validating community members' lived experiences and centering their needs and hopes when pinpointing opportunities for change and community healing. With this lens as a foundation, when schools are ready to expand sex ed, they can approach their efforts from a healing-centered and inclusive perspective.

The full package of Numbers to Narratives materials will prepare you to lead two workshops: an initial session with young people and a following session with school staff and potentially other key school community members. Numbers to Narratives workshop are recommended to last 3.5-4 hours, and activities are designed for a range of 15-20 total participants.

We recommend starting with a workshop with young people because, to really understand young people's lived experiences, it's crucial to hear from young people directly (HIPs, 2022). You will also receive suggestions for integrating young people's perspectives into the staff workshop.

Numbers to Narratives Materials

The Numbers to Narratives suite of materials includes the...

Numbers to Narratives Implementation Guide, which structures the process of planning and leading Numbers to Narratives workshops.

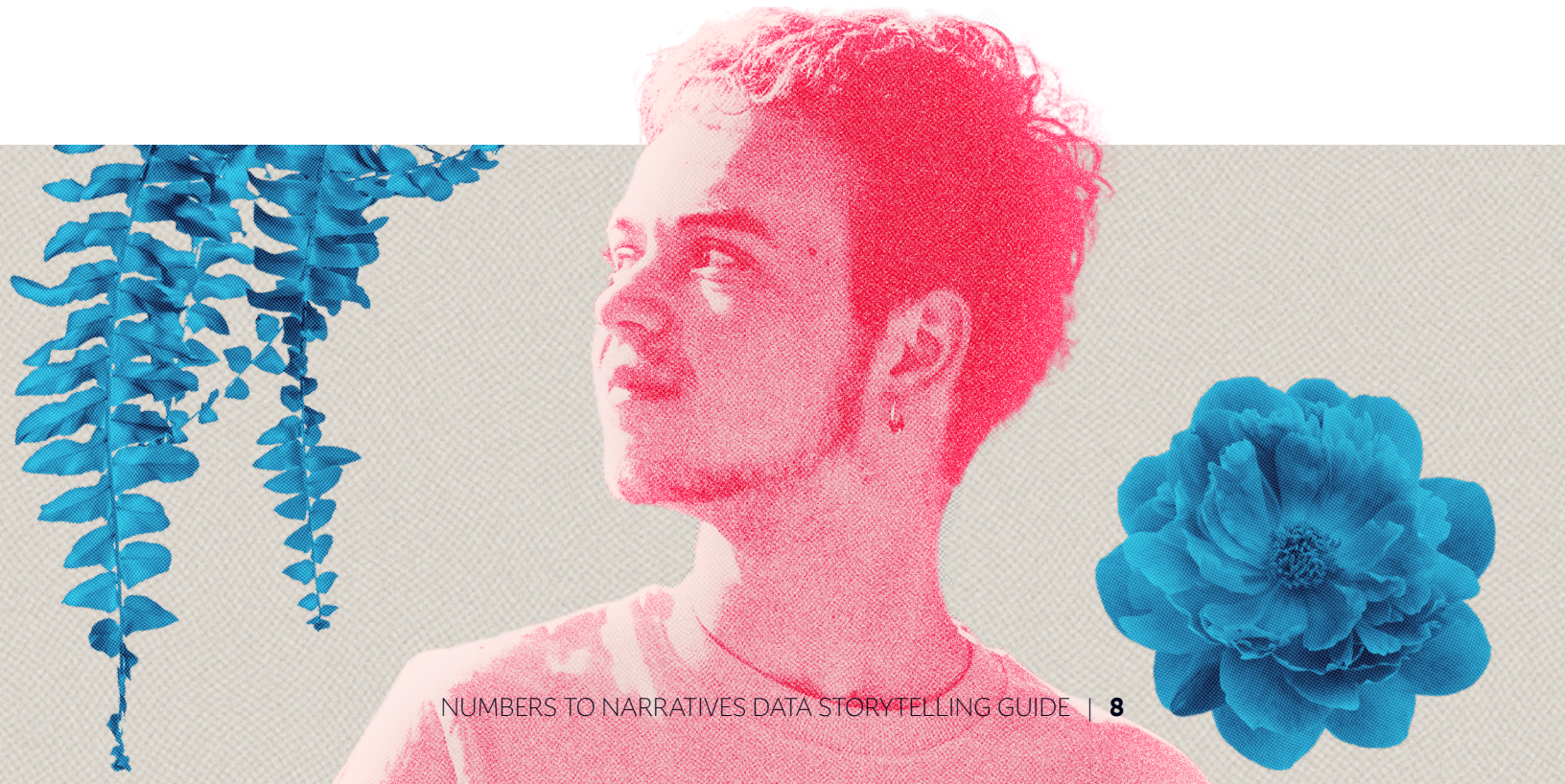
Numbers to Narratives, In Real Life (IRL) Case Study, which shares the stories of how other communities used a similar process to make sense of local data.

Numbers to Narratives Data Storytelling Guide, which contains suggested sources for pulling relevant data, a quick 101 guide to data visualization, and tips for storytelling through data visualizations.

Numbers to Narratives Workshop 1 Session Guide, which gives facilitators a script and instructions for leading an initial workshop with young people.

Numbers to Narratives Workshop 2 Session Guide, which gives facilitators a script and instructions for leading the follow-up workshop with school staff.

You can access all the resources at: https://www.HealthyTeenNetwork.org/Thrivology/Resources/Numbers-Narratives



About the Workshops

Numbers to Narratives workshops has three main sections:

1

Understanding community context

The first section gets participants talking about what resources already exist in their community to support young people's sexual and reproductive health. They identify what's already working and explore additional supports that young people wish existed.

2

Making sense of adolescent health data

In this section, participants work together to take a look at national and local data related to young people's sexual and reproductive health and the relevant social determinants that impact it.

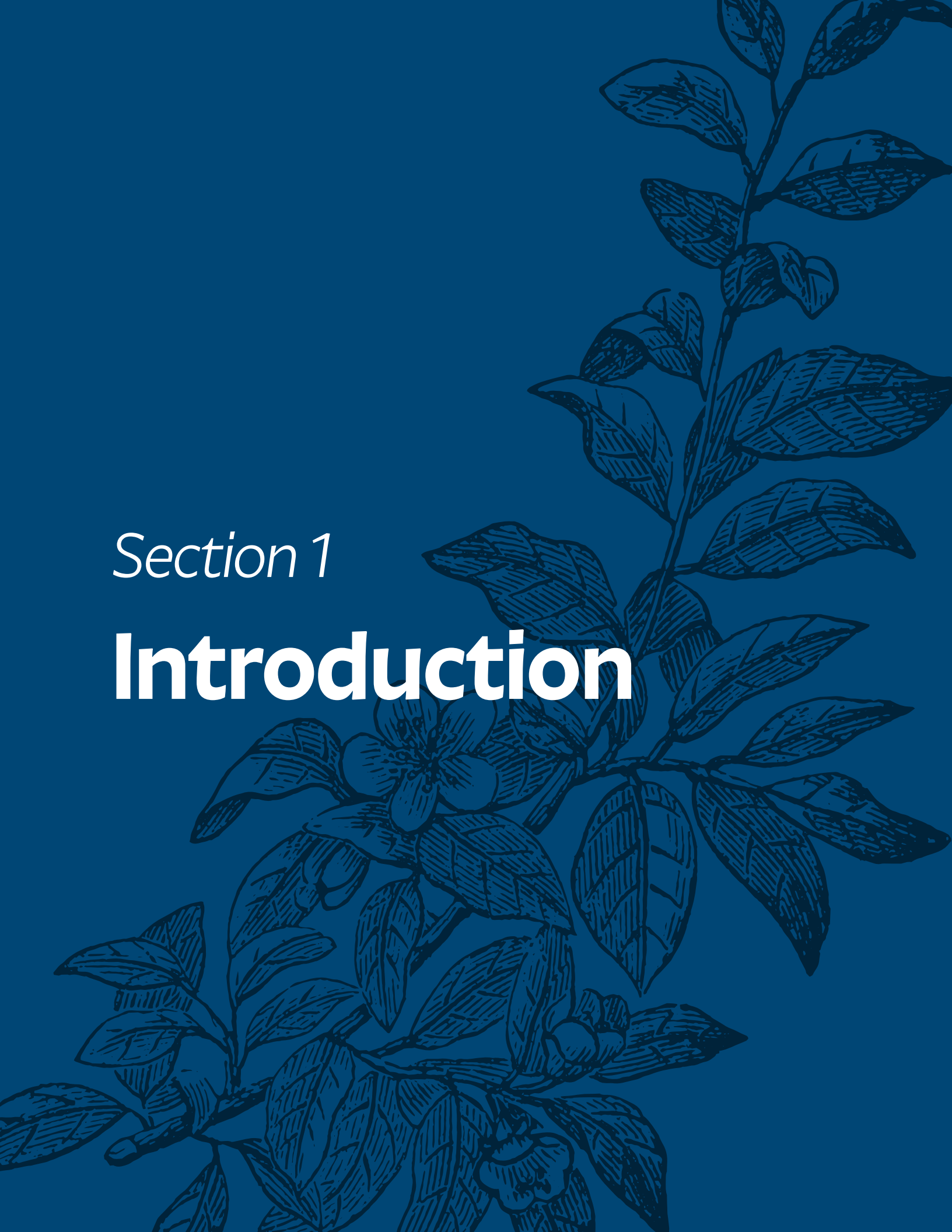
3

Sharing young people's stories to prompt action

Finally, participants discuss stories of how an imagined young person in the community can care for their sexual and reproductive health. Young people create these stories in Workshop 1 based on their lived experiences. In Workshop 2, school staff review these stories to spark a conversation on areas of change to prioritize and possible actions.

We developed the Numbers to Narratives school staff workshop activities and guidance for how to plan and lead them in conversation with educators and community-based sexual health nonprofit workers. We designed activities for the workshop with young people in collaboration with Thrivology Youth Leaders, a group of 18-24 year olds who are passionate advocates for adolescent sexual and reproductive health.

Contents



Section 1

Introduction

1.1. About This Data Storytelling Guide

The Numbers to Narratives Data Storytelling Guide provides instructions for where to find data, how to collect data, and ways to visualize data.

The primary purpose of this guide is to support the process of obtaining and visualizing national and local data related to young people's sexual and reproductive health, along with the social determinants that influence it. While it was designed to aid Numbers to Narratives facilitators in making sense of adolescent health data for workshops, this guide is also a valuable resource for anyone working in adolescent sexual and reproductive health.

Whether you're seeking to deepen your understanding of data visualization, explore data on young people's sexual and reproductive health, or craft compelling narratives through storytelling with data, this guide provides a practical starting point. Public health data has long been a cornerstone for understanding health trends and shaping policies, and this guide aims to bridge the gap between complex data and actionable insights.

1.2. Acknowledging Biases in Data

Public health data has not been without its flaws, often reflecting deep-seated biases that have skewed our understanding and response to various issues.

As you explore the data in preparation for your workshops, it's important to recognize that public health data is not immune to bias. Historically, it has reflected societal inequities, often prioritizing individual behavior as the key driver of outcomes while underestimating the influence of systemic factors like poverty, racial discrimination, educational inequities, and institutional policies (Krieger, 2012; Braveman & Gottlieb, 2014; Baciu et al., 2017). This narrow focus can lead to a misrepresentation of the challenges young people face, particularly in adolescent sexual and reproductive health.

For instance, much of the data and interventions in this field have centered on personal choices, such as abstaining from sex or using contraception, while neglecting the broader context in which these decisions are made (Guttmacher, 2024). Factors such as access to healthcare, the availability of comprehensive sex education, and the impact of systemic inequities profoundly shape these outcomes. This approach often places undue responsibility on individuals, perpetuating a narrative that outcomes like teen pregnancy result from personal failings rather than structural barriers.

The variability in sex education laws across the U.S. highlights how systemic factors influence sexual health. While some states require comprehensive and medically accurate sex education, others provide outdated or incomplete curricula—or no requirements at all. In some states, LGBTQ+ identities are stigmatized or excluded, further marginalizing these young people and exacerbating health inequities. This patchwork of policies not only creates disparities in education quality but also complicates our ability to gather consistent, unbiased data that reflects the full scope of influences on adolescent health.

Acknowledging these biases is essential to developing a more accurate understanding of adolescent sexual health. By broadening the lens to include systemic factors and addressing the root causes of inequities, we can create data-informed policies and interventions that truly support young people in achieving better health outcomes.

One common bias in public health data is its usage of binary frameworks, such as categorizing gender as male or female or health outcomes as success or failure, that oversimplify the complexity of human experiences. These categorizations can obscure the nuances of systemic inequities and diverse lived experiences, limiting our ability to address health disparities effectively. (Rodriguez-Lainz et al., 2018; Perreira et al., 2019). For example, national surveys on adolescent sexual health often fail to capture the experiences of LGBTQ+ young people adequately. Data collection methods that do not include questions about sexual orientation or gender identity lead to invisibility and a lack of targeted interventions for these groups (Budge et al., 2013). As a result, LGBTQ+ young people may not receive appropriate sexual health education or support services tailored to their needs.

Additionally, the collection and interpretation of public health data have frequently lacked cultural awareness and respect, which in turn can actually deepen disparities among specific groups of people. This oversight has led to data collection methods and health interventions that do not fully capture the cultural contexts of the communities they aim to serve. For example, many public health campaigns have utilized culturally insensitive messaging or failed to account for language barriers, which can alienate immigrant and ethnic minority young people from accessing crucial sexual health resources (Kagawa Singer et al., 2016).

What can we do to counteract biases in data? Reframing public health data to emphasize empowerment rather than blame is essential for fostering meaningful change.

Research shows that highlighting the benefits of health-promoting actions leads to better outcomes than focusing solely on the negative consequences of inaction (Murayama et al., 2023). This approach not only supports individual motivation but also redirects attention toward systemic solutions, recognizing that health outcomes are shaped by broader social, cultural, and institutional factors. By shifting the narrative, we can create a foundation for collective action that addresses root causes and promotes equity.

By focusing on how social, economic, and environmental factors (e.g., housing quality, access to education, access to healthcare, social support, etc.) influence health outcomes, we encourage a broader understanding of social determinants of health and promote strategies that address these root causes (Solar & Irwin, 2010). This focus not only helps in formulating effective interventions but also supports a more compassionate and constructive public discourse (Teye-Kwadjo, 2022).

It is important to supplement less inclusive data with information from targeted sources that better portray the experiences of young people with diverse identities.

We invite you to consider whose voices are represented in the data and whose are missing, including LGBTQ+, BIPOC, and young people with disabilities. Representation is essential for creating meaningful data-informed policies and practices. Consider using the data sources below to supplement for any voices that are part of your community but are missing from other data sets you're using.

1. The 2021 National School Climate Survey: Conducted by Gay, Lesbian & Straight Education Network, this survey assesses the school environment for LGBTQ+ students nationwide. It focuses on factors such as safety, harassment, and the overall climate, shedding light on how these elements affect the academic success and well-being of LGBTQ+ students. The findings help inform policies and practices to create more inclusive and supportive school environments.
2. The Trevor Project 2023 U.S. National Survey on the Mental Health of LGBTQ Young People: This extensive survey examines the mental health and well-being of LGBTQ+ young people across the U.S. It highlights the prevalence of mental health issues, the impact of societal factors, and the effectiveness of various support systems. It is a vital resource for understanding and addressing LGBTQ+ young people's needs.
3. Transgender Identity and Experiences of Violence Victimization, Substance Use, Suicide Risk, and Sexual Risk Behaviors Among High School Students- 19 States and Large Urban School Districts, 2017: This study provides comprehensive data on the experiences of transgender high school students, highlighting their exposure to violence, substance use, and suicide risks, as well as their sexual behaviors. These findings shed light on the unique challenges faced by this group.

4. UNICEF Child Disability Data Portal: This resource helps identify systemic gaps and guide the development of inclusive policies and interventions. It offers comprehensive data and insights on children with disabilities worldwide, including prevalence, barriers to inclusion, and disparities in health, education, and social outcomes.
5. Cornell University's 2022 Status Report on Disability in the United States: This report highlights disparities faced by people with disabilities and serves as a critical tool for understanding and addressing inequities in access and opportunities. It provides an in-depth analysis of disability demographics, employment, education, and health outcomes in the U.S.

Share disclaimers with your audience and work collectively to understand the opportunities the data presents in your community.

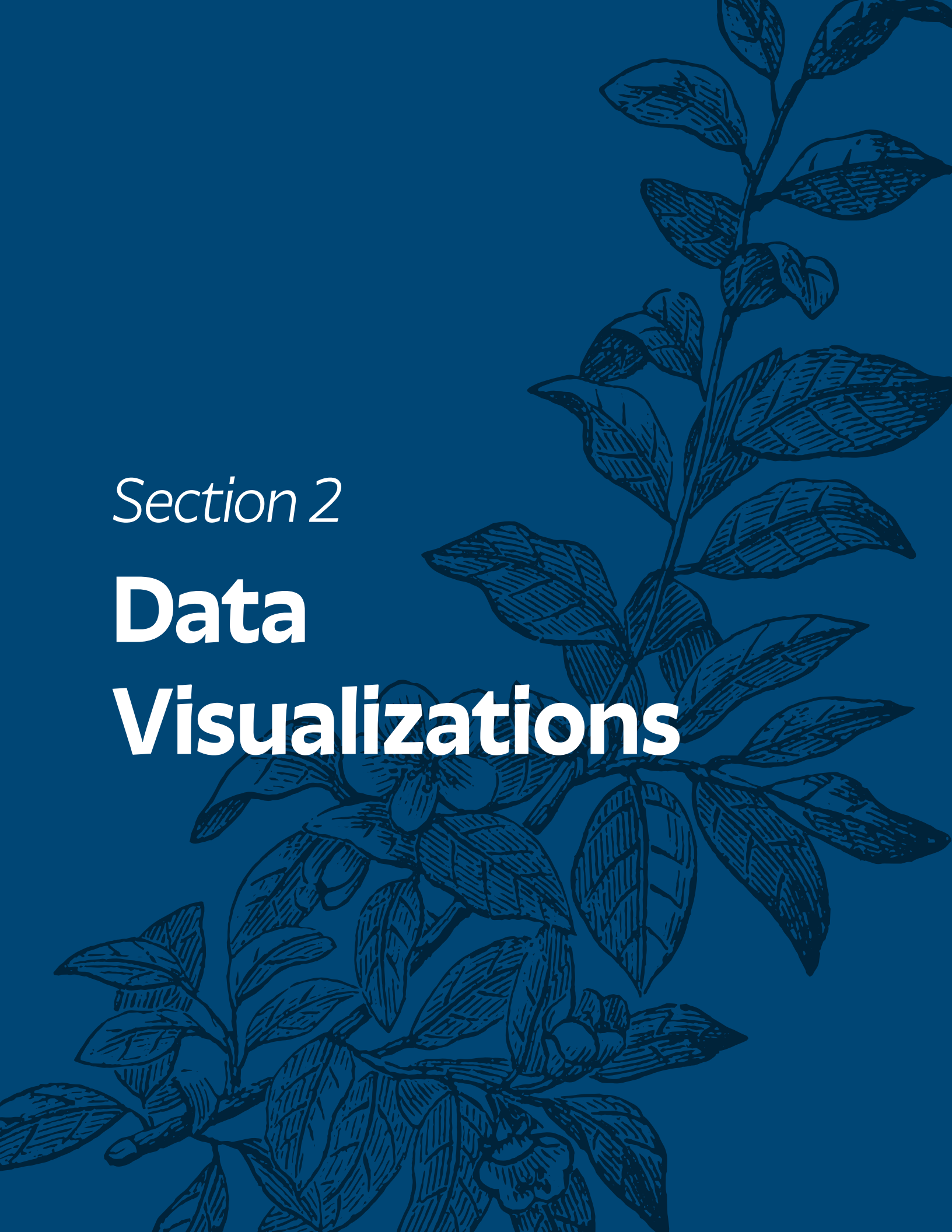
Consider how to make the story you tell with data inclusive, culturally responsive, and aware of systems-level challenges. These data can be either related to adolescent sexual and reproductive health behaviors (e.g., condom use, alcohol/drug use before sex, sexually transmited disease testing) or the social determinants of health indicators that impact adolescents (e.g., alcohol use, unemployment, public school enrollment, high school completion, family support, insurance converage, income inequality).

While this guide provides national, state, and some local data for these indicators and others, we also recommend seeking local data from your health department, school administration, local universities, or local government. These local data can help you understand and share the story of what is happening in your community, making challenges feel more immediate and actionable, and inspiring meaningful change.

Finally, please note both for yourself and your audience that the following data sources and examples contains some sensitive topics that may be distressing or triggering to some individuals. These topics include, among others, references to suicide, dating violence, and homicide. Please prioritize your well-being and take care as you engage with the content. We encourage you to take breaks and seek support as needed.

Section 2

Data Visualizations



2. Data Visualizations

This section provides resources for choosing an appropriate type of data visualization, creating your own visualizations, and interpreting data visualizations.

Effective data visualization allows you to tell a story with your data. Data visualizations turn raw data that can be difficult to understand into meaningful visuals that you can use to share trends, patterns and relationships.

For the data sources in Section 3, visualizations will often be created for you automatically. However, if using data from other sources, you may need to create visualizations yourself. In either case, it's important to choose a type of visualization that best supports participants in making sense of the data.

In this section, you'll find resources for choosing a data visualization, creating your own and interpreting data visualization. We share five common data visualizations with instructions for how to make them yourself using Google or Microsoft tools. Each of these data visualizations are also available premade in the data sources shared in Section 3 of this resource.

Whether you download these visualizations from a source or create them yourself from raw data, we provide steps for using these visualizations to tell a compelling story.

2.1. Choosing a Visualization Format

There are countless ways to visualize and display data, but knowing the basics can take you a long way! Below, we'll share a quick overview of five common types of visualization to help you select the one that is most appropriate for your data.

Data Visualization Option 1: Tables

Tables are often the underlying structure used for holding data that can then be turned into other visualizations. However, when formatted well, they can also be a great way to share exact values and detailed information. They are useful when you need to present precise data. For instance, a table can list the specific sexual health services provided at various clinics, along with the number of adolescents accessing each service, or a breakdown of survey responses on sexual health knowledge among adolescents.

Data Visualization Option 2: Bar Charts

Use bar charts to compare quantities across different categories. They are great for showing the difference between groups, such as the distribution of contraceptive use among different age groups of adolescents.

Data Visualization Option 3: Line Charts

Line charts are ideal for displaying one data indicator over time. They help you see trends and patterns. For instance, a line chart can show the trend in adolescent birth rates over the past decade or track the changes in the prevalence of sexually transmitted infections among adolescents over several years.

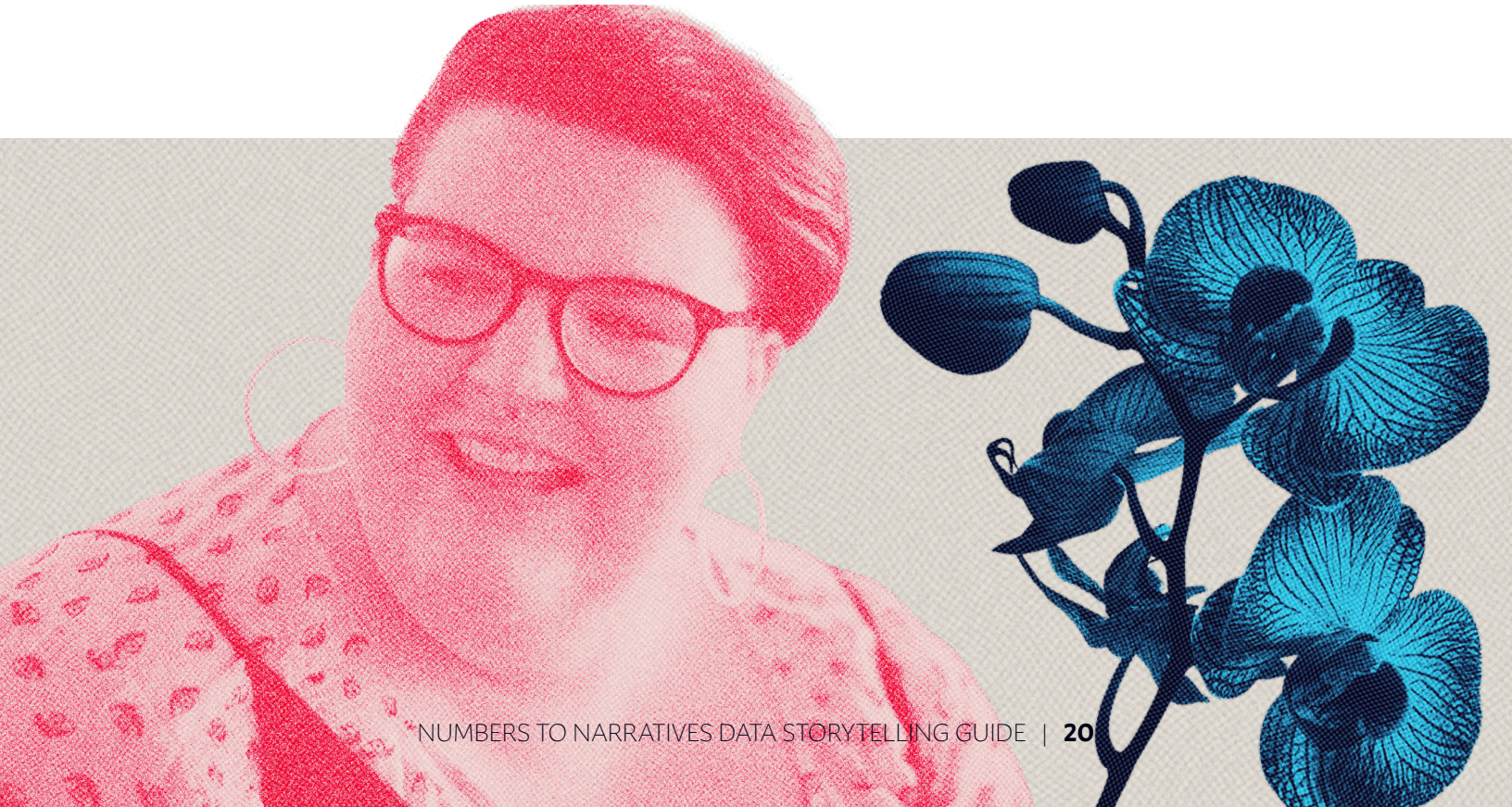
Data Visualization Option 4: Scatter Plots

Scatter plots are useful for showing relationships between two indicators over time. They can help identify correlations, such as the relationship between certain health behaviors and outcomes. For example, a scatter plot could illustrate the relationship between the percentage of adolescents using contraceptives and the teen pregnancy rate in different regions, highlighting how increased contraceptive use might correlate with lower pregnancy rates.

Data Visualization Option 5: Maps

Use maps to show geographical data, especially distributions across a region. For example, a map can illustrate the geographic distribution of teen pregnancy rates across different states or countries, or highlight areas with higher rates of access to sexual health services for adolescents.

Now that you've gotten an overview and comparison of five common types of visualization, the next section will share detailed guidance on how to create each one.



2.2. Creating Data Visualizations

In this section, we'll break down specific steps for how to create five common types of visualizations. Before diving in to the details, check out the tips below for overarching guidance on creating visualizations.

1

Select the appropriate type of visualization.

Your choice of visualization type should be guided by the type of data you have and the story you want to tell.

2

Use customization tools.

These can help to ensure your visualization is accurately conveying the story of your data.

3

Use titles and labels to add clarity.

Titles and labels enable you to provide the context you need so the meaning of your data isn't lost.

4

Leverage colors to support understanding.

To make your visualizations appealing and clear, we encourage you to use colors that are coordinated in the same palette, yet distinct enough to provide visual contrast. To ensure accessibility, make sure you aren't just relying on color to convey meaning. You can also use one of the many free contrast checker tools available online.

Creating Tables

1

Prepare your data.

Download or obtain raw data. Arrange your data in a structured format. Each row should represent a different entry (e.g., a school), and each column should represent a different variable (e.g., the number of ASRH programs implemented).

2

Enter your data.

Open Excel or Google Sheets and enter your data into the cells. Ensure each column has a header describing the variable.

3

Format your data as a table.

- Excel: Go to the "Home" tab, click on "Format as Table", and choose a table style. Confirm that your table has headers in the dialog box that appears.
- Google Sheets: After selecting your data, go to the "Format" menu, choose "Alternating colors" (to apply a table style), and confirm that your table has headers.

4

Customize your table to support understanding.

Add borders, adjust column widths, and format text for clarity and readability.

Sample Formatted Table

School	Required Sex Ed Program	Number of Students
School A	Yes	500
School B	No	550
School C	Yes	380
School D	Yes	483
School E	No	489
School F	No	192
School G	Yes	310
School H	No	431
School I	No	982

Additional Sample Table

Reprinted from "Sexual activity and contraceptive use among teenagers aged 15–19 in the United States, 2015–2017," by G. M. Martinez & J. C. Abma, 2020, NCHS Data Brief No. 366, National Center for Health Statistics. Hyattsville, MD.

Data table for Figure 4. Methods of contraception ever used among females aged 15–19 who had ever had sexual intercourse: United States, 2015–2017

Method	Percent	Standard error
Condom	96.8	(0.91)
Withdrawal	65.1	(4.78)
Pill	52.5	(4.23)
Emergency contraception	18.9	(3.29)
Depo-Provera	18.6	(2.90)
Fertility awareness methods	10.8	(2.39)
LARC	20.0	(4.05)
Implant	15.2	(3.18)
Contraceptive patch	1.0	(0.45)
IUD	*	*
Contraceptive ring	*	*

* Estimate does not meet NCHS standards of reliability.

NOTES: LARC is long-acting reversible contraception. IUD is intrauterine device.

SOURCE: NCHS, National Survey of Family Growth, 2015–2017.

Creating Bar Charts

1

Prepare your data.

Make sure your data is organized in a simple table format. For example, list different categories (e.g. counties) in one column and their corresponding values (e.g. the number of adolescent pregnancies) in another column.

2

Insert a bar chart.

- In Excel: Select both columns of data, then go to the "Insert" tab at the top, find the "Charts" group, and click on "Bar Chart". Choose the type of bar chart you want (like vertical or horizontal).
- In Google Sheets: Select both columns of data, then click on the "Insert" menu, choose "Chart", and select "Bar Chart" from the options.

3

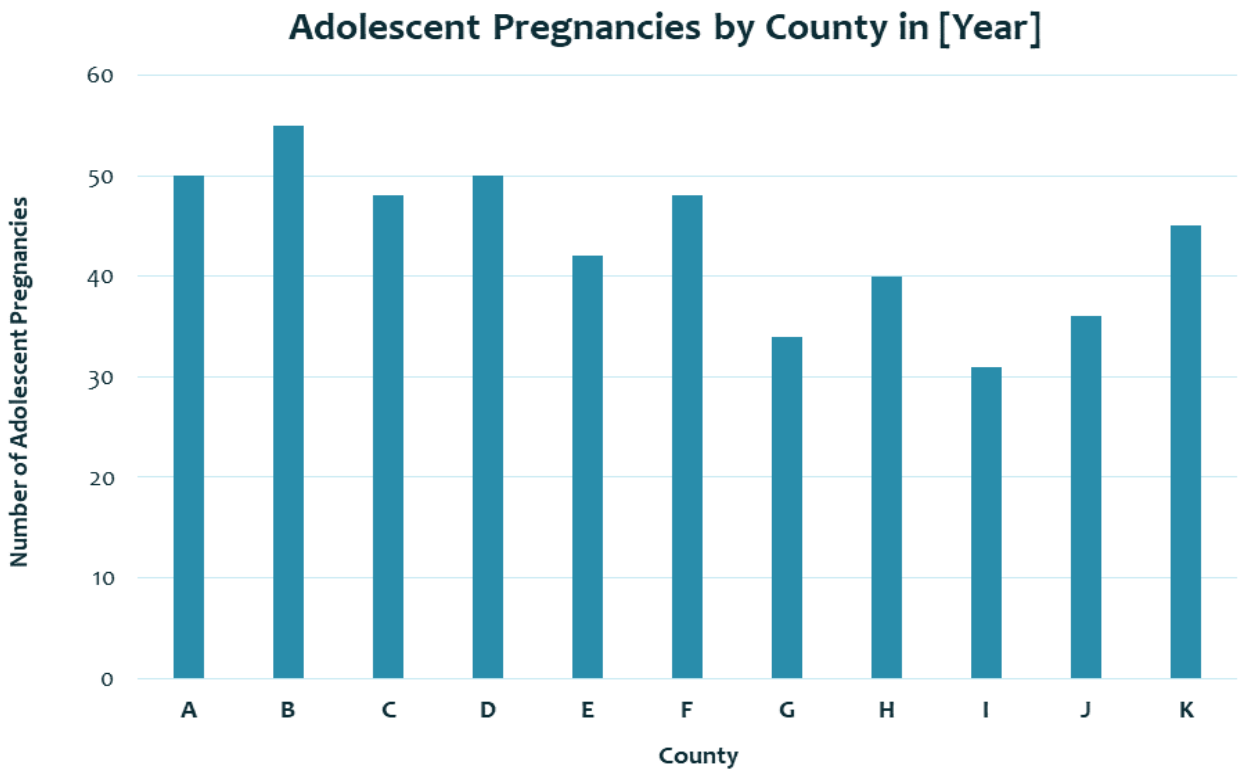
Customize your bar chart.

Once your chart appears, you can customize it. Add a title by clicking on it and typing your title. You can also adjust the colors, labels, and axis titles to make your chart easier to understand.

Sample Bar Chart Data Table

County	Number of Adolescent Pregnancies
A	50
B	55
C	48
D	50
E	42
F	48
G	34
H	40
I	31
J	36
K	45

Corresponding Sample Bar Chart



Additional Sample Bar Charts

Reprinted from "Sexual activity and contraceptive use among teenagers aged 15–19 in the United States, 2015–2017," by G. M. Martinez & J. C. Abma, 2020, NCHS Data Brief No. 366, National Center for Health Statistics. Hyattsville, MD.

Figure 1. Never-married females and males aged 15–19 who have ever had sexual intercourse: United States, 2002–2017

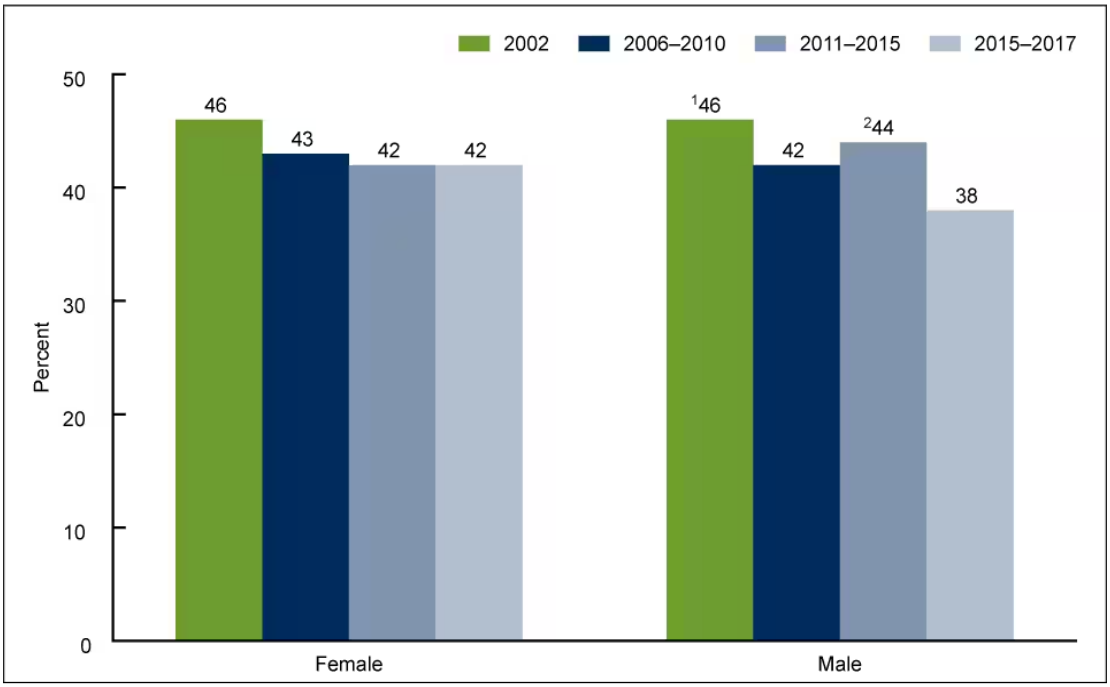
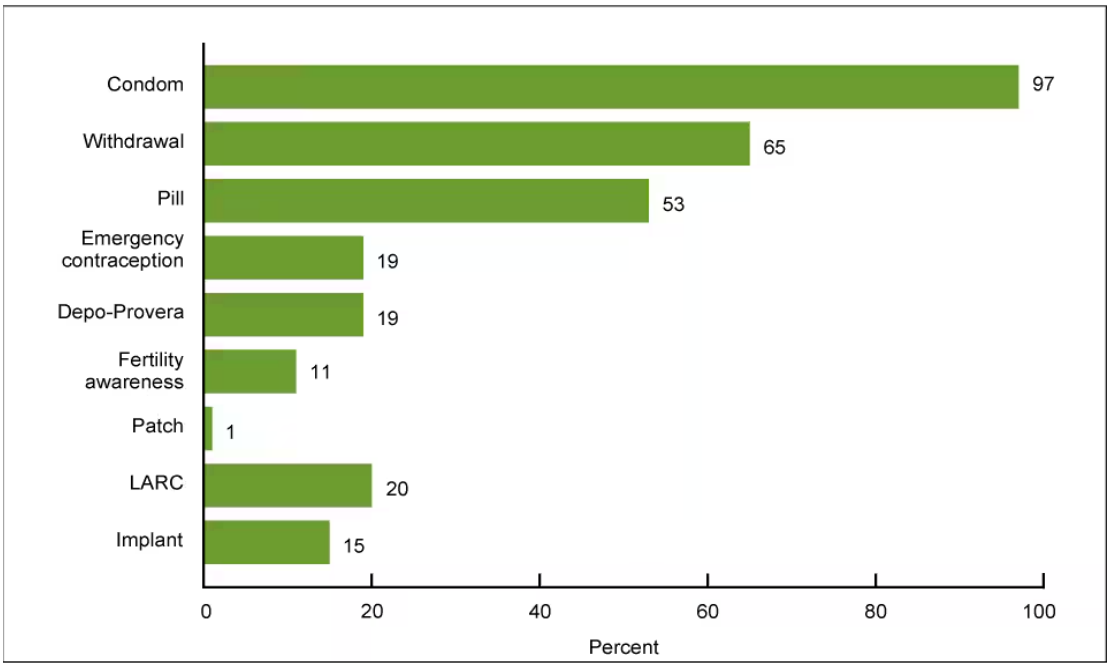


Figure 4. Methods of contraception ever used among females aged 15–19 who had ever had sexual intercourse: United States, 2015–2017



Creating Line Charts

1

Prepare your data.

Make sure your data is organized in a simple table format. Time periods (e.g., years or months) should go in the first and the corresponding values (e.g., the number of STD cases) should be in the second column.

2

Insert a line chart.

- In Excel: Select both columns of data, go to the "Insert" tab, click on "Line Chart" (it might be under "Charts"), and select the type of line chart you want.
- In Google Sheets: Select both columns of data, then click on the "Insert" menu, choose "Chart", and select "Line chart".

3

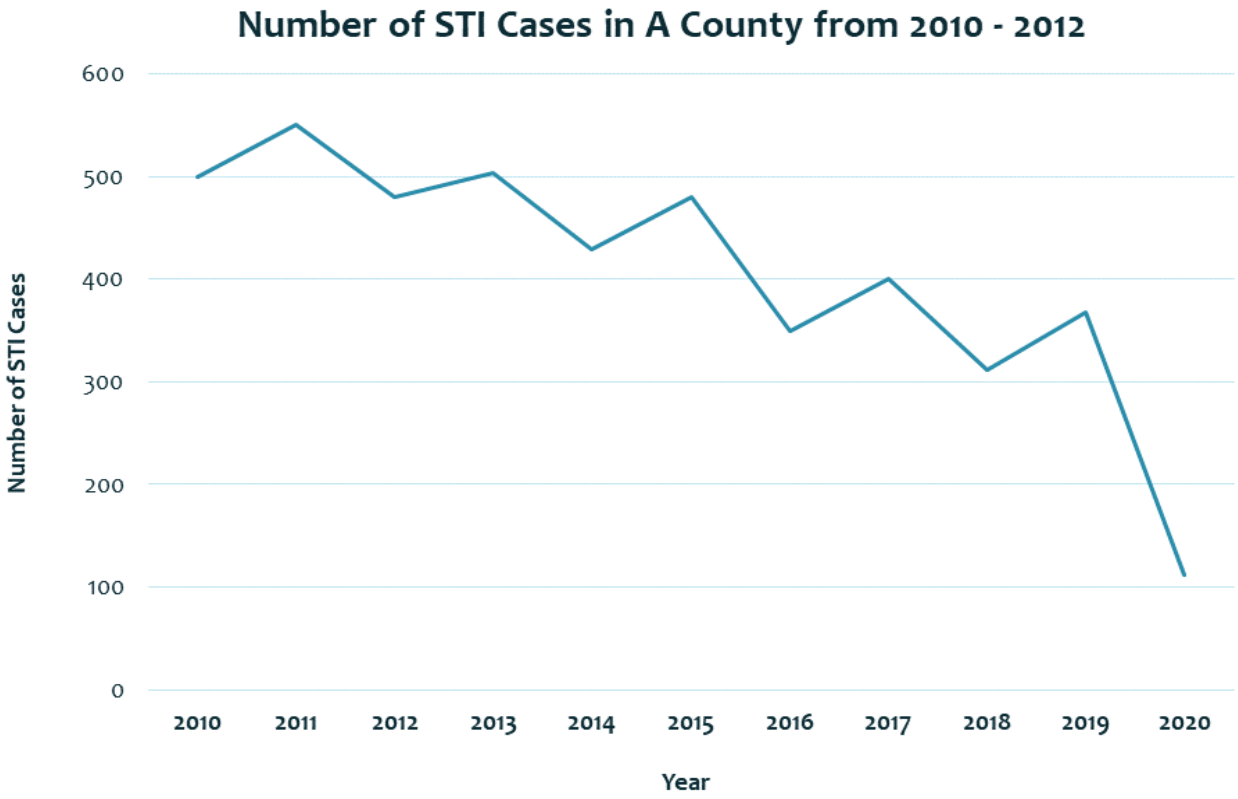
Customize your line chart.

Once your line chart appears, you can customize it. Add a title, adjust the colors, and label the axes (for example "Year" for the x-axis and "Number of STD Cases" for the y-axis).

Sample Line Chart Data Table

Year	Number of STD Cases
2010	500
2011	550
2012	480
2013	503
2014	429
2015	480
2016	349
2017	400
2018	312
2019	367
2020	112

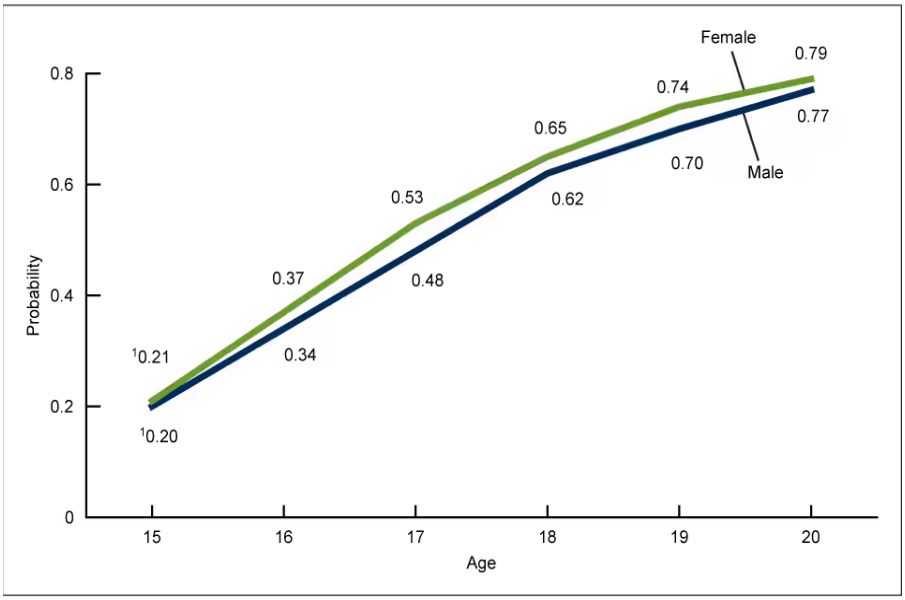
Corresponding Sample Line Chart



Additional Sample Line Charts

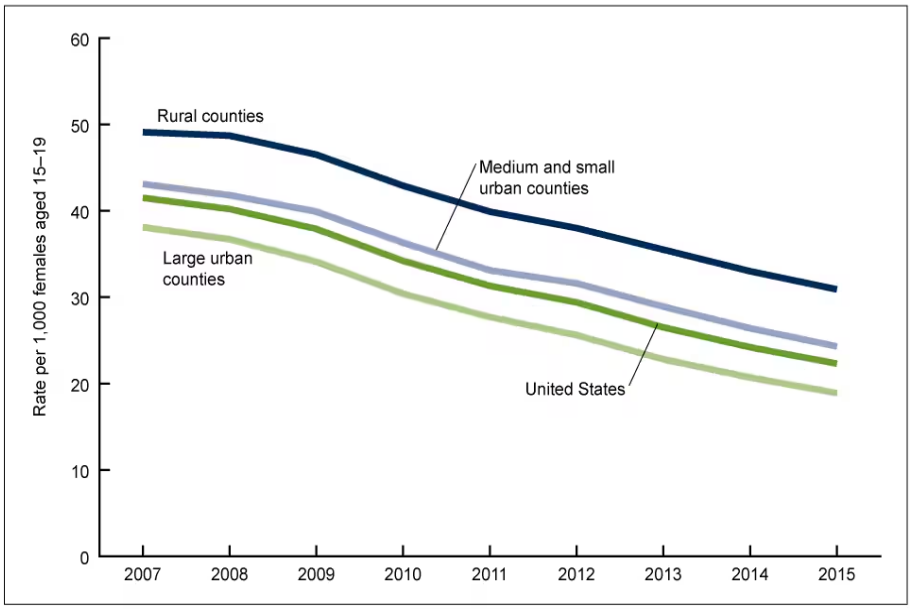
Reprinted from "Sexual activity and contraceptive use among teenagers aged 15–19 in the United States, 2015–2017," by G. M. Martinez & J. C. Abma, 2020, NCHS Data Brief No. 366, National Center for Health Statistics. Hyattsville, MD.

Figure 2. Probability of having had sex by age 15, 16, 17, 18, 19, and 20 for females and males: United States, 2015–2017



Reprinted from "Teen birth rates for urban and rural areas in the United States, 2007–2015," by B. E. Hamilton, L. M. Rossen, & A. M. Branum, 2016, NCHS Data Brief No. 264, National Center for Health Statistics. Hyattsville, MD.

Figure 1. Teen birth rates, by urbanization level of county: United States, 2007–2015



Creating Scatter Plots

1

Prepare your data.

Make sure your data is organized in a simple table format. List pairs of data points in two columns, each representing the variables you want to compare. For example, you might compare age with the number of self-reported sexual partners.

2

Insert a scatter plot.

- In Excel: Select both columns of data, then go to the "Insert" tab at the top, find the "Charts" group, and click on "Scatter Chart". Choose the type of scatter plot you want (for example with straight lines or smooth lines).
- In Google Sheets: Select both columns of data, then click on the "Insert" menu, choose "Chart", and select "Scatter chart".

3

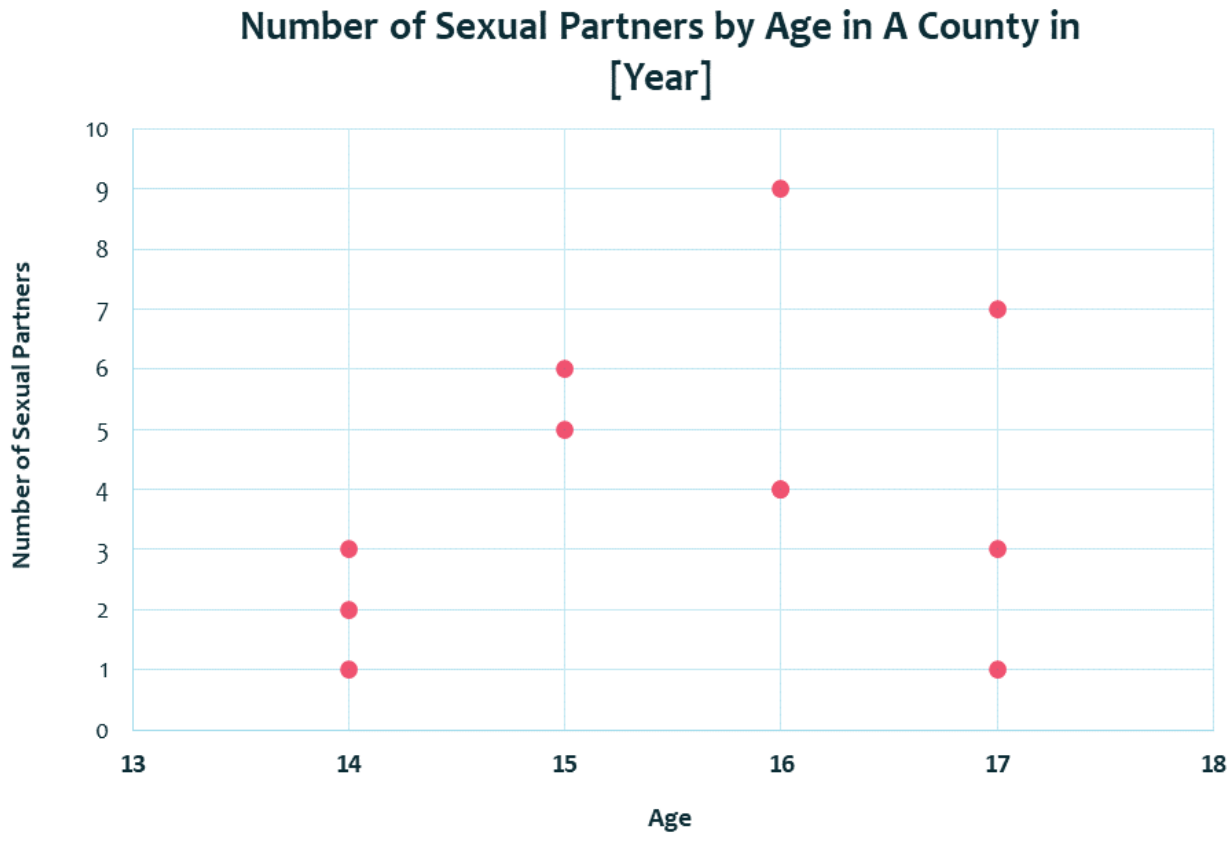
Customize your scatter plot.

Once your scatter plot appears, you can customize it. Add a title by clicking on it and typing in your title. You can also adjust the colors, labels, and axis titles to make your scatter plot clearer and more informative.

Sample Scatter Plot Data Table

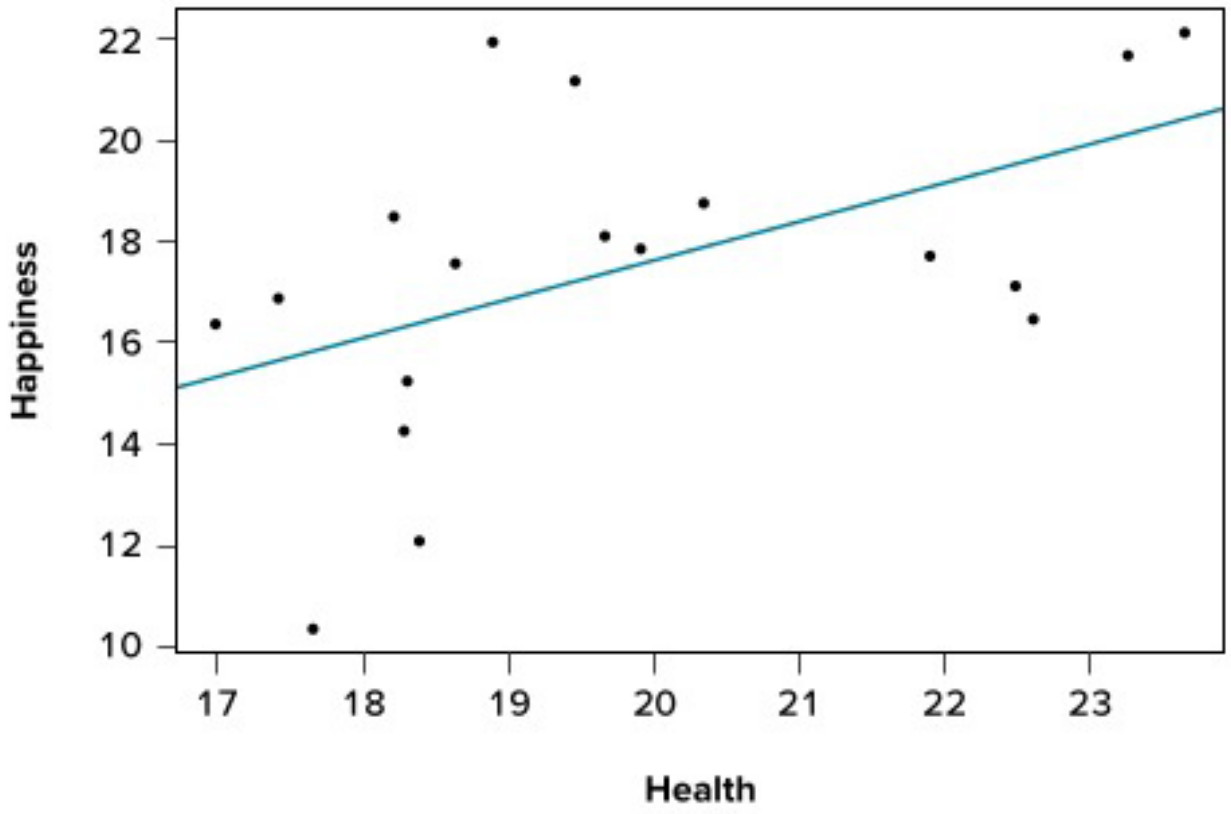
Age	Number of Sexual Partners
14	1
14	2
14	3
15	6
15	5
16	4
16	9
16	4
17	7
17	3

Corresponding Sample Scatter Plot



Additional Sample Scatter Plot

Reprinted from "Scatter plot health and happiness [Figure 13.3]" (2021, November 15) by J. Schmitt, University of Missouri-St. Louis.



Creating Maps

1

Prepare your data.

Organize your data into a simple table format. Ensure your data includes geographic information such as addresses, cities, countries, or latitude and longitude coordinates. All geographic information should be at the same level (e.g., county, addresses) and matched to the same health data (i.e. number of STD cases).

2

Insert a scatter plot.

- Go to the Datawrapper Map creator.
- Click "Build your own map".
- Select either a Choropleth map (best for showing trends across regions like states or counties) or Symbol map (best for comparing specific counts in specific locations like cities).
- Scroll down to select the type of map you would like to create (e.g., National, State, County).
- Upload or copy and paste data. Match data using tools available. Check and correct errors.

3

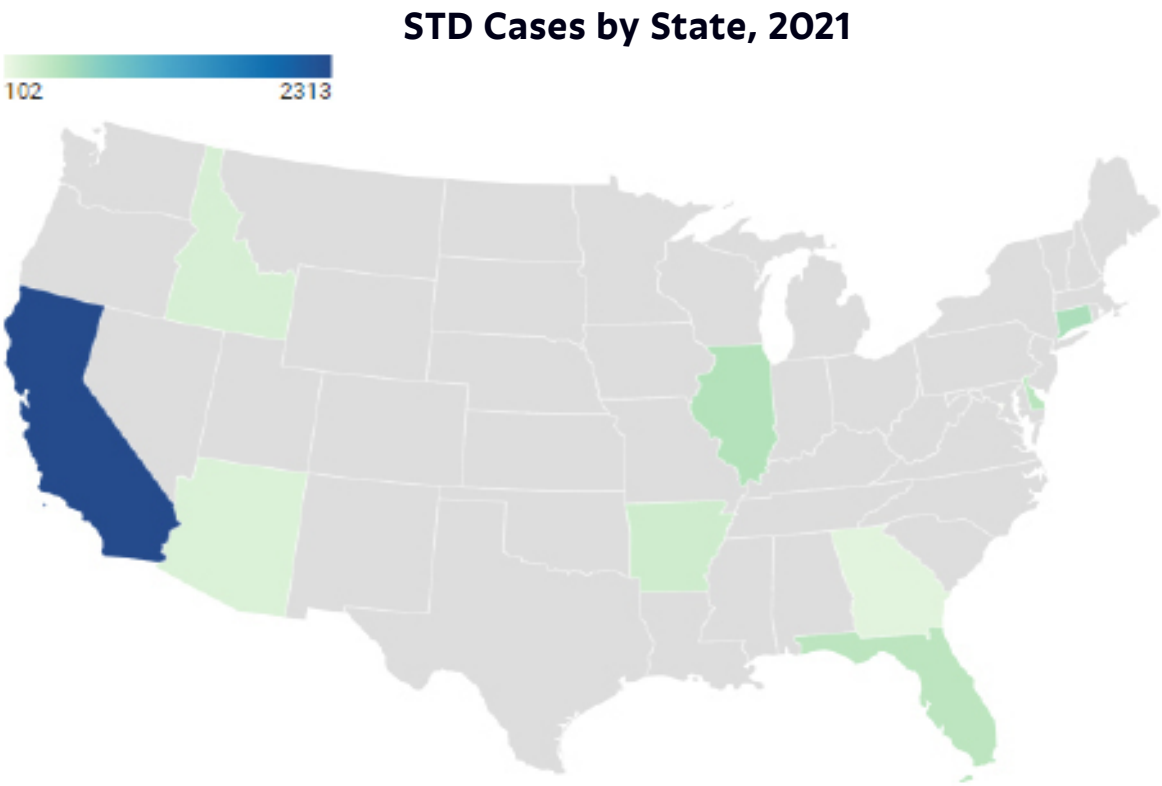
Customize your scatter plot.

Customize your map by adding a title and adjusting the color palette.

Sample Map Data Table

State	Number of STD Cases
Alabama	1233
Arizona	234
Arkansas	313
California	2313
Connecticut	522
Delaware	444
District of Columbia	102
Florida	432
Georgia	192
Idaho	263
Illinois	482

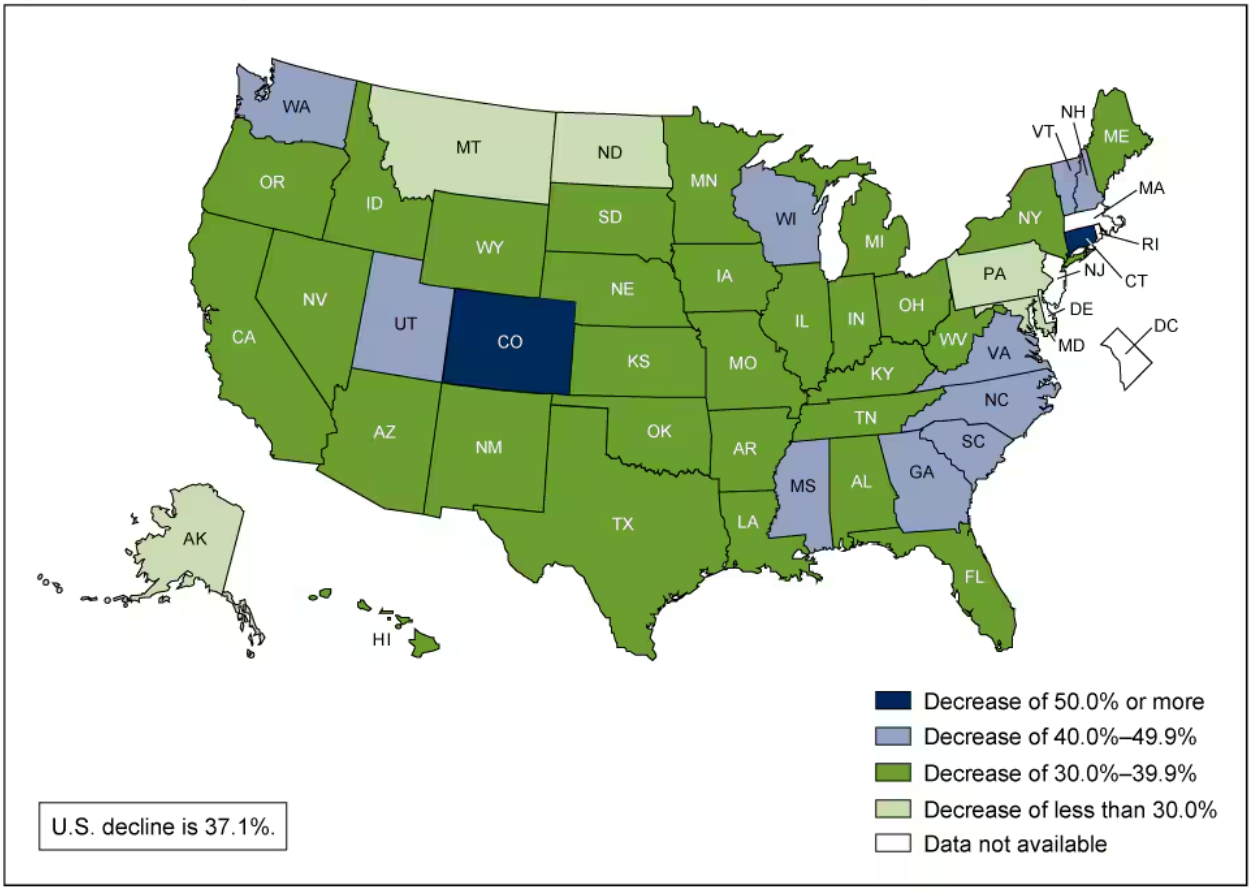
Corresponding Sample Choropleth Map



Additional Sample Map

Reprinted from "Teen birth rates for urban and rural areas in the United States, 2007–2015," by B. E. Hamilton, L. M. Rossen, & A. M. Branum, 2016, NCHS Data Brief No. 264, National Center for Health Statistics. Hyattsville, MD.

Figure 3. Percent change in the teen birth rate for rural counties: United States, each state, 2007 and 2015



2.3. Interpreting Data Visualizations

Once you have selected or developed your visualization, interpreting it effectively is key to telling your story.

The tips on the following pages can help you to determine what story your data is telling based on the data visualization and figure out how to best deliver this story.

1. Start by examining the axes and labels.

Pay attention to what the axes represent and check the units of measurement.

This initial step sets you up to understand the scale and context of the data. Axes are the reference lines on a chart. The horizontal line is the x-axis, and the vertical line is the y-axis. Labels are the text elements on a chart that describe the data. They include titles, axis labels, and data point labels.

Sample Line Chart Interpretation

The below example is reprinted from Curtin and Garnett, 2023.

Starting by looking at the title, a reader can understand the time range, location and population the data represents.

The horizontal line, or x-axis, shows years so that data can be viewed over time. The vertical line, or y-axis, is clearly labeled so readers know it represents deaths per 100.000 people aged 15-19.

This labeling creates a meaningful scale with which to make sense of the data. Death causes (i.e. homicide and suicide) are labeled clearly and closely so a reader can understand which is represented by each line.

Figure 3. Suicide and homicide death rates among people aged 15–19: United States, 2001–2021

2. Next, identify the main message.

Once you understand the context of a visualization by looking at its labels and axes, move on to figuring out the primary takeaway from the visualization. To do this, look at the overall shape, trends, and key data points.

Interpreting a Bar Chart

Compare heights or lengths of bars. Higher or longer bars indicate larger values. Identify categories with significant differences.

Interpreting a Line Chart

Analyze trends over time. Identify peaks, troughs, and consistency in data. Look for overall direction (upward, downward) and any cyclical patterns.

Interpreting a Map

Examine geographic distributions and patterns. Compare different regions using color gradients and symbols. Understand regional variations and clusters.

Interpreting a Scatter Plot

Look for correlations between variables. Identify clusters and outliers. Understand the relationship between the variables on the x and y axes.

Interpreting a Table

Compare specific values across categories. Analyze summary statistics (totals, averages). Look for inconsistencies and contextualize data.

Sample Bar Chart Interpretation

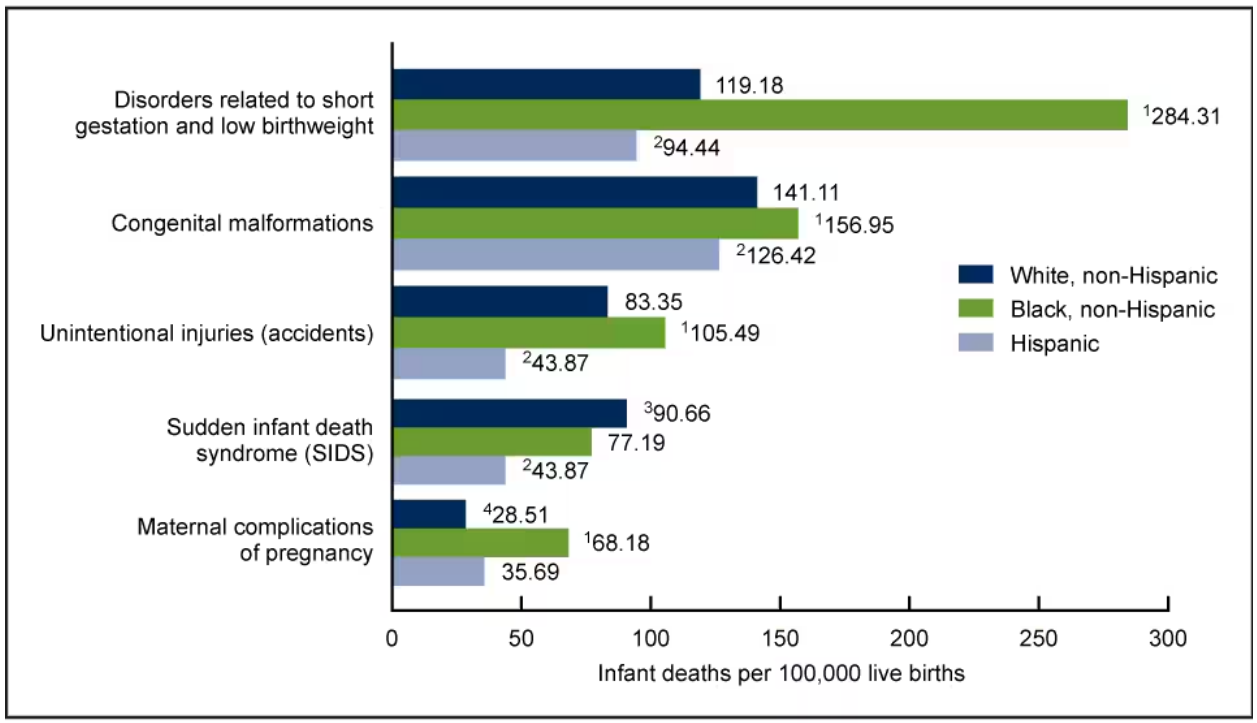
To interpret a bar chart, compare heights or lengths of bars. Higher or longer bars indicate larger values.

In the example below reprinted from Woodall & Driscoll, 2020, the longest vertical bars indicate the highest infant mortality rates. By reviewing the bar lengths, a reader can tell which mortality cause has the most deaths.

It is also helpful to identify categories with significant differences. Further, color coordination allows a reader to identify if differences in outcomes exist by race.

In this example, a reader can identify that higher rates exist among Black, non-Hispanic youth in all causes except sudden infant death syndrome.

Figure 3. Infant mortality rates for the five leading causes of death among infants born to mothers aged 15–19, by maternal race and Hispanic origin: United States, 2017–2018

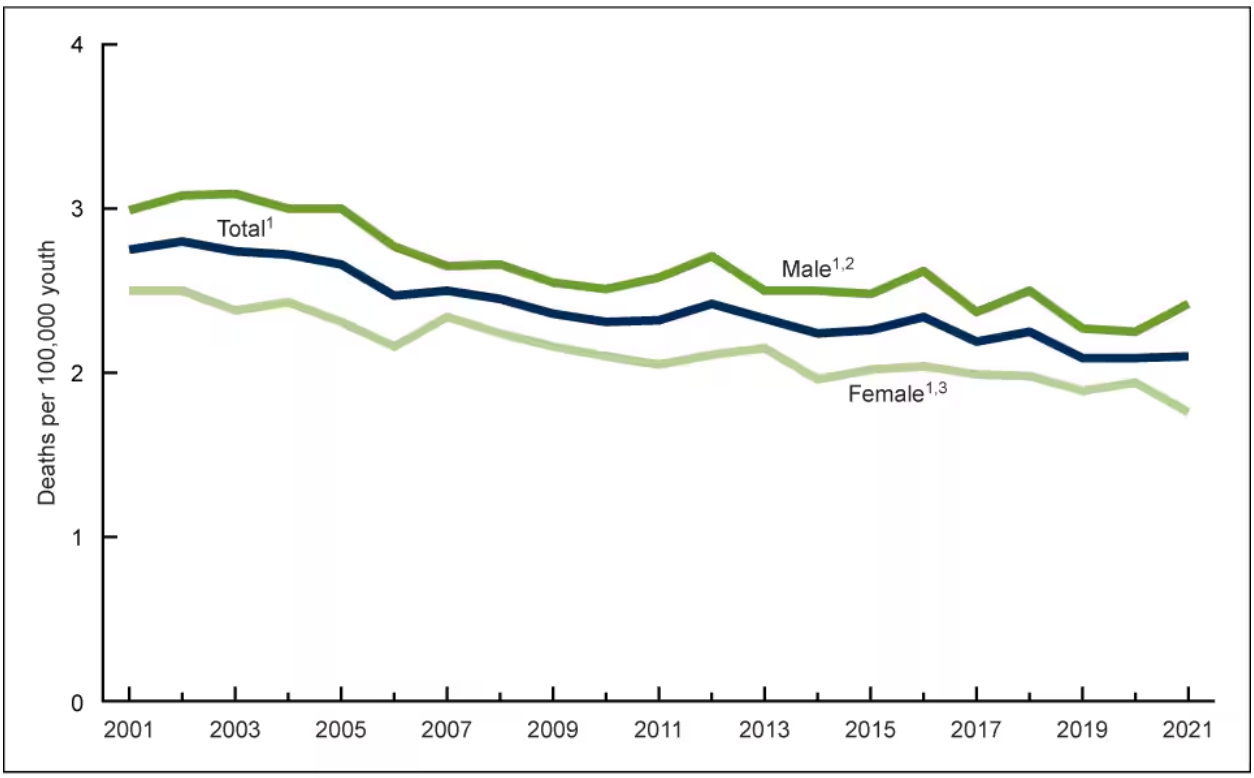


Sample Line Chart Interpretation

Line charts allow you to analyze trends over time. Look for peaks, troughs, and consistency in data. Look for overall direction (upward, downward) and any cyclical patterns.

In the below example reprinted from Curtin and Anderson, 2023, one can follow the horizontal axis (x-axis) to track trends over time and see a decline across gender. Looking at peaks and dips at certain points of time, like 2016 and 2006 respectively tells an interesting story about how this trend might have varied at certain points.

Figure 1. Cancer death rate for youth ages 0–19 years, by sex: United States, 2001 to 2021



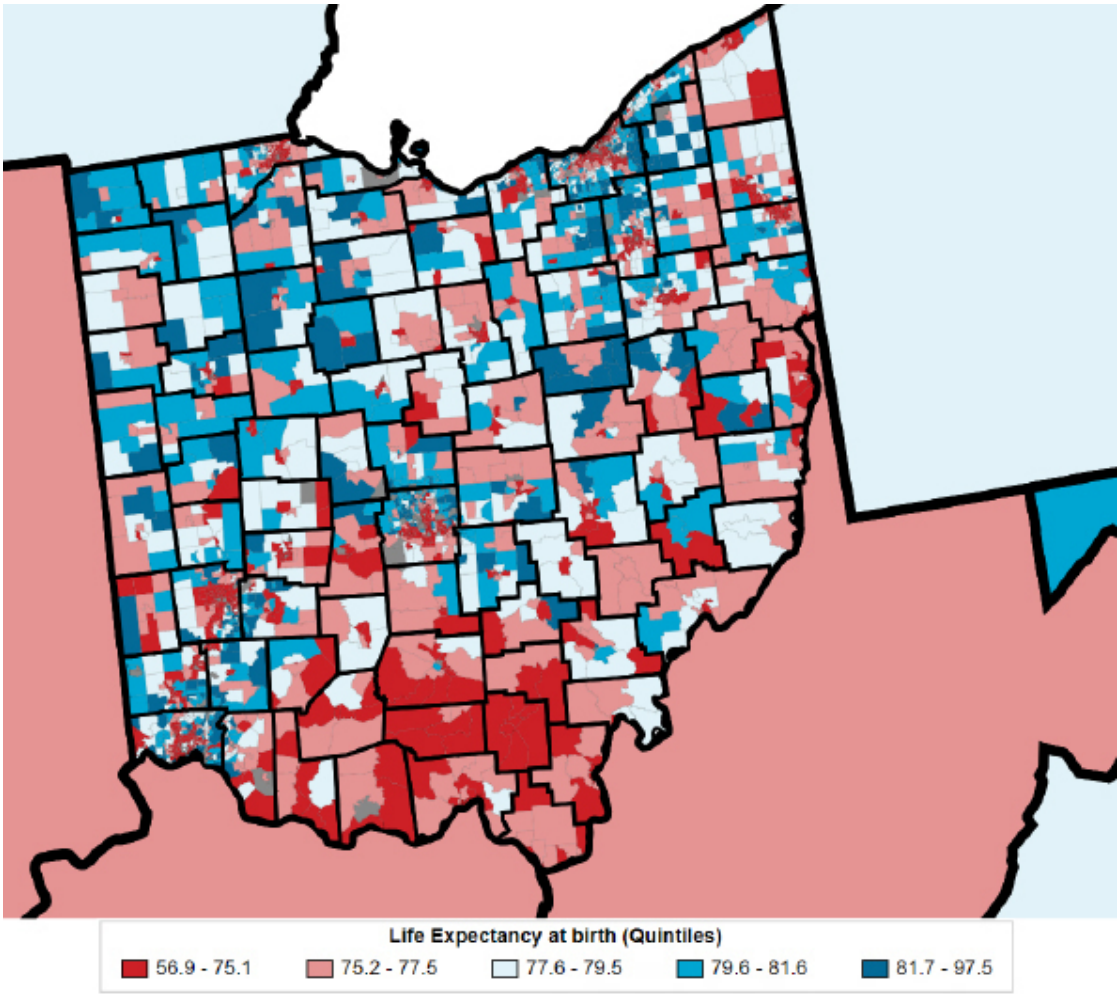
3. Finally, look for patterns and outliers.

Patterns can help you make predictions, while outliers might indicate unusual events or errors.

In the below example reprinted from the National Center for Health Statistics (n.d.), the reader can observe patterns in longer life expectancy (blue) and shorter life expectancy (red).

Observing patterns in shorter life expectancy indicates a curious trend in Southern Ohio. Outliers can be observed where blue counties exist near red ones and where there are blue and red regions within the same county. Both these patterns and outliers present useful opportunities for interpretation and additional context to understand why they are present.

Life Expectancy at Birth for Ohio, 2010-2015



Section 3

Data Sources

3. Data Sources

Now that you've gotten a sense of how to create and interpret visualizations, let's talk about where to actually find data! This section details a few of the main sources we recommend using for adolescent sexual and reproductive health data.

Selecting the data that matter most to your community is essential for your workshops to be impactful. These data sources in this section are reliable because they use rigorous methodologies, validated data from reputable sources, and standardized processes to ensure accuracy, consistency, and credibility. They were selected because they include data at multiple levels and allow you to generate visualizations. These data sources provide detailed and customizable outputs that you can use to develop fact statements for Workshop 1 with young people and visualizations for Workshop 2 with school staff. The data available is from a wide range of dates. Therefore, please check all outputs for the data from which the data is pulled, prioritizing more recent data. We recommend using data specific to your state, county, or school district and pulling in national-level data for comparison.

For each source, you will find an overview of the source, the level of data available (e.g. national, state and local) and a step-by-step guide with instructions for accessing the data and creating visualizations. It is possible that the websites may be updated after this resource is published, in which case, some of these steps may not be precisely accurate.

While the sources represented in this section include data at multiple levels and generate some visualizations, they might not be the most inclusive data sets. We recommend supplementing these data sources with data that specifically capture the experience of young people in your community, especially young people with disabilities and LGBTQ+ young people who are often not included in these data sets.

3.1. CDC Youth Risk Behavior Survey

The CDC Youth Risk Behavior Survey (YRBSS) is a nationwide survey conducted by the Centers for Disease Control and Prevention (CDC). It collects data from students in grades 9—12 on key health behaviors and experiences that contribute to the leading causes of death and illness during both adolescence and adulthood.

These results help in understanding the factors that contribute to the leading causes of illness, death, and disability among young people. This data set is a good resource if you are looking for national-level data and state comparisons of specific adolescent behaviors and outcomes. Most indicators are available at the national, state and local level, allowing for clear comparison. Note that state-level data is not available for Minnesota and Oregon.

Data Levels

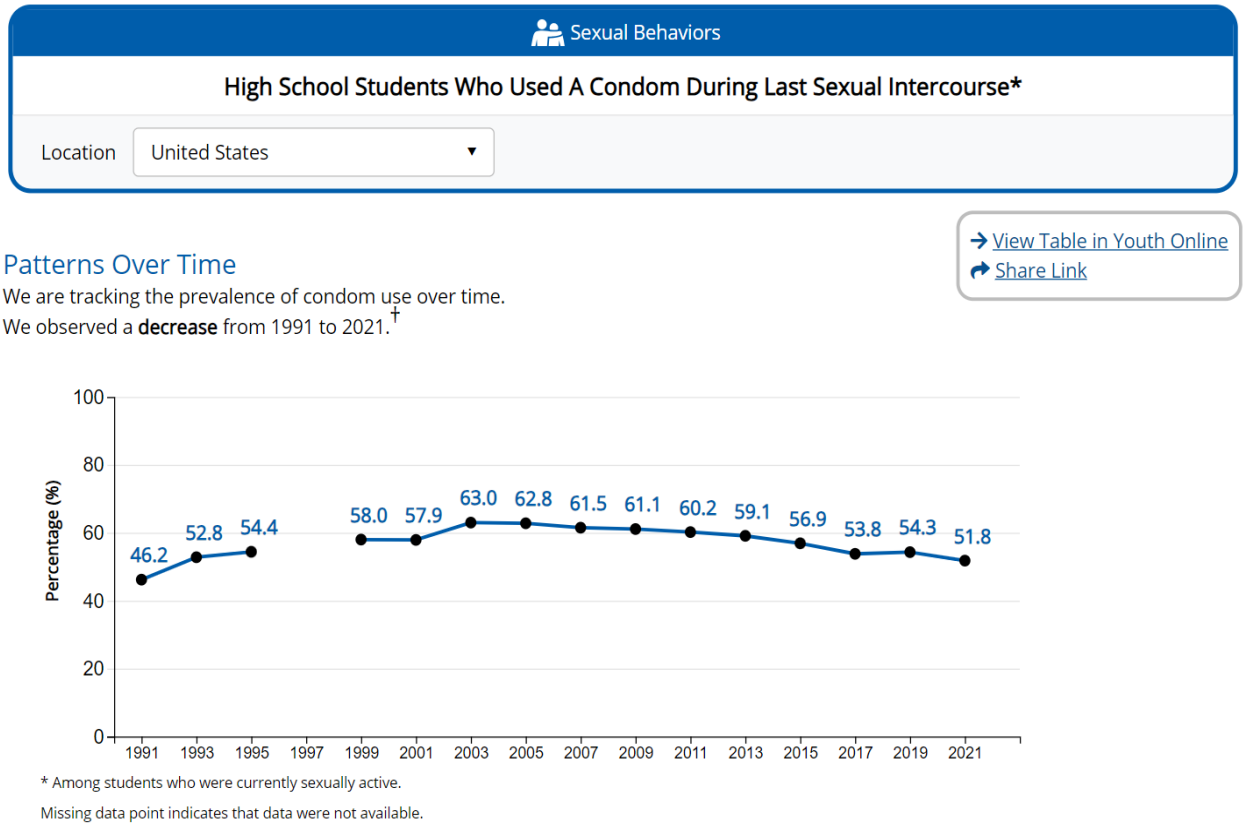
1. National (e.g., alcohol use before age 13, condom use, sex before age 13, etc.)
2. State (e.g., screen time, not using birth control, HIV testing, STD testing, etc.)
3. Some counties and cities (e.g., sexual violence, alcohol/drugs before sex, etc.)

Accessing Data and Visualizations

1. Go to the CDC YRBSS page.
2. Select the "Youth Online Data Analysis" tool under Data Analysis Tools.
3. Use the drop-down menu to select national-level data, state-specific data, or school-district level data. Once selected, press Go.
4. Scroll down to see a table with data for all health topics for all demographics.
5. To choose a specific health topic or demographic marker, select these (or multiple) from the Filter Data box.

6. Once you have the data you are looking for selected, use tools such as Compare, Graph and Map to find the view that works well for the story you want to tell.
7. For additional visualizations on specific questions, go to the YRBSS Explorer.
    - Select the health topic you are interested in (e.g., sexual behaviors, substance use).
    - Select the indicator you are interested in.
    - Select either graph or table.
    - Use the location drop-down menu to select national, state, or school district-level data.
    - Select the year or years you would like data from.
    - Print/save the visualization.

Example Graph Visualization Reprinted from YRBS Explorer



3.2. The Guttmacher Data Center

The Guttmacher Data Center, managed by the Guttmacher Institute, offers comprehensive information on sexual and reproductive health in the United States. It collects and analyzes data on topics including contraception, abortion, pregnancy, and sexually transmitted diseases (STDs).

This data set is a good resource if you are looking for outcome data on contraception, abortion, pregnancy, birth rate, insurance status and maternal health at the national, state or county level.

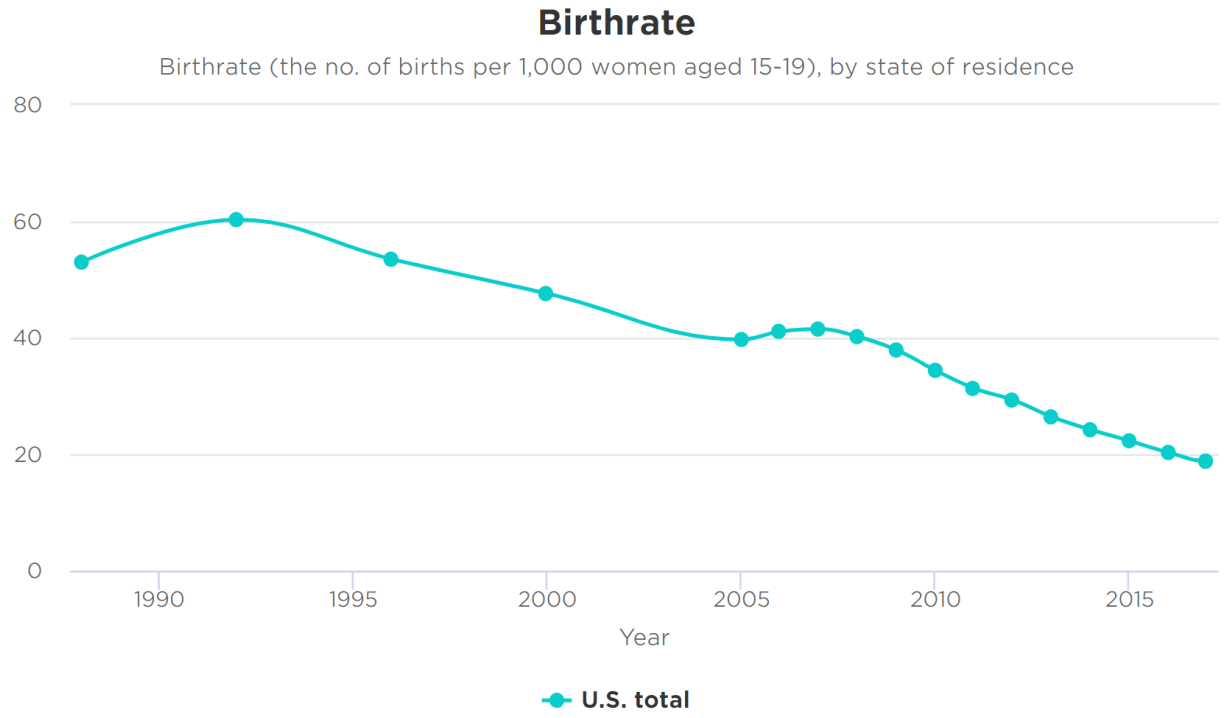
Data Levels

1. National (e.g., number of abortions among women aged < 15, aged 15-19, etc.)
2. State (e.g., number of abortion providers, teen pregnancy birthrate by age, etc.)
3. County (contraception data, e.g., women in need of contraceptive services, etc.)

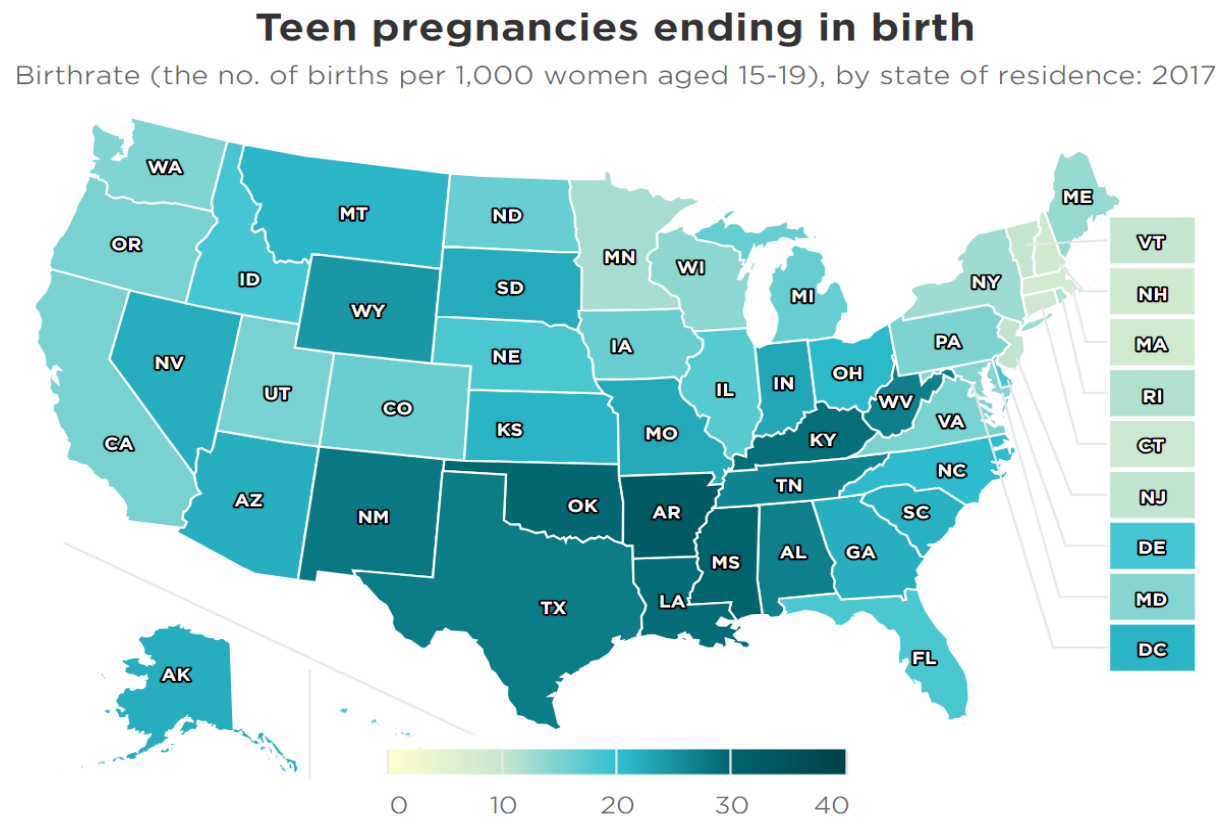
Accessing Data and Visualizations

1. Go to the Guttmacher Data Center.
2. Select "U.S. States" for national-level and state-specific data. Select “U.S. Counties” for county-level data (only available for contraception topics).
3. Choose the indicator(s) of interest. Select additional states and topics for comparison.
    - To build a table, select 1 or more states and 1 or more topics. Select the TABLE button below.
    - To build a map visualization, select 1 topic with a map icon. Select the MAP button below.
    - To build a trend chart, select 1–6 states, plus 1 topic with a trend icon. Select on the TREND button below.

Example Trend Visualization Reprinted from Guttmacher Data Center



Example Map Visualization Reprinted from Guttmacher Data Center



3.3. Kids Count Data Center

The Kids Count Data Center, operated by the Annie E. Casey Foundation, has comprehensive data on child well-being in the United States. It covers key indicators such as education, economic status, health, and family/community environment.

This data set is a good resource if you are looking for determinant and outcome data, especially around social determinants of health, at the national, state, county and local level over a wide range of years. Many of the same indicators are available at all data levels, allowing for clear comparison between national and local data.

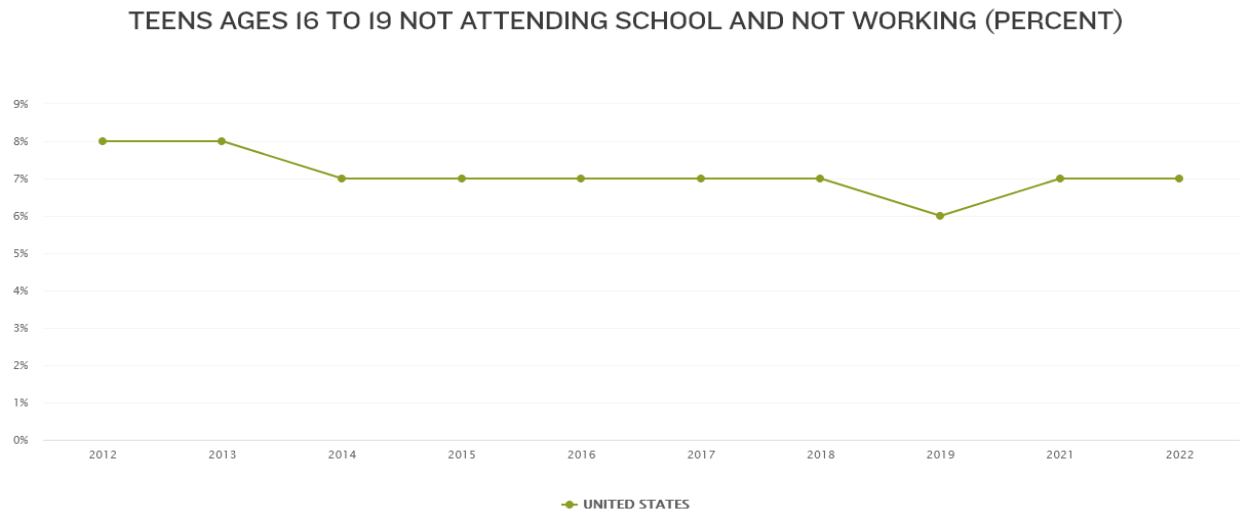
Data Levels

1. National (e.g., child population by gender, children in immigrant families, etc.)
2. State (e.g., unemployed teens ages 16 to 19, children under age 18 in poverty, etc.)
3. County (e.g., births to mothers under age 20, child and teen death rate, etc.)
4. Congressional District/Zip Codes/Major Cities (e.g., public school enrollment, etc.)

Accessing Data and Visualizations

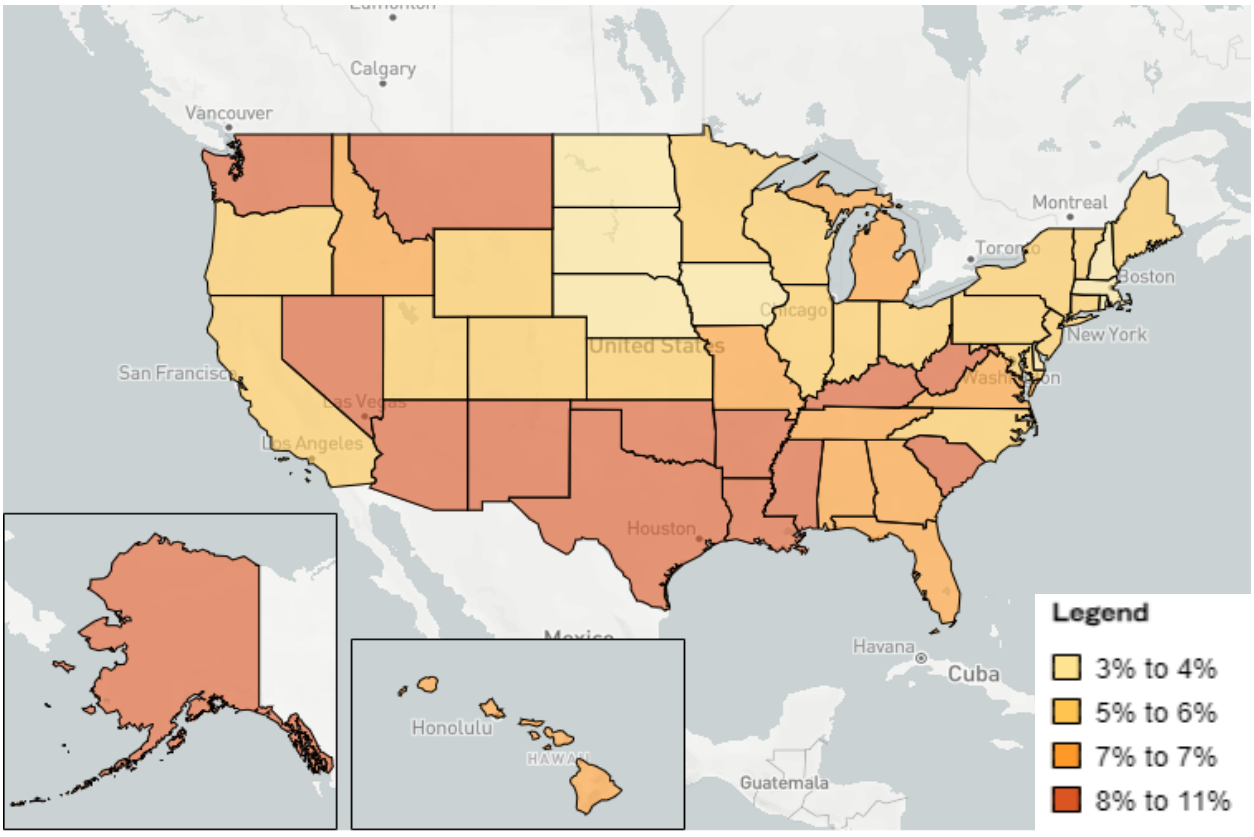
1. Go to the Kids Count Data Center.
2. Select a specific state or click the U.S. Data button for national-level data.
    - Choose the specific indicator you are interested in (e.g., young adults in poverty).
    - Toggle to Sort/Rank to view ranking of all states for the indicator.
3. To view data by topic instead of location, select “By Topic” from the top of the screen. Choose an indicator then view data for all states per health topic.
4. De-select any years for which you do not want data.
5. Use tabs to view data in table, map, trend chart or bar chart.
6. Select "save image" to download data visualization.

Example Trends Visualization Reprinted from Kids Count Data Center



Example Map Visualization Reprinted from Kids Count Data Center

TEENS AGES 16 TO 19 NOT ATTENDING SCHOOL AND NOT WORKING (PERCENT) - 2022



3.4. County Health Rankings & Roadmaps

County Health Rankings and Roadmaps is a project led by the Robert Wood Johnson Foundation in collaboration with the University of Wisconsin Population Health Institute. It offers a comprehensive view of health outcomes and factors influencing health at the county level in the United States.

This data set is a good resource if you are looking for health outcomes and determinants (e.g., data social, economic and physical environment factors) at the county-level, with easy comparisons at the state and national level. A strength of this data set is that the same indicators are available at the county, state and national level, allowing for clear comparison. Data can also be sorted by areas of strength and areas to explore.

Data Levels

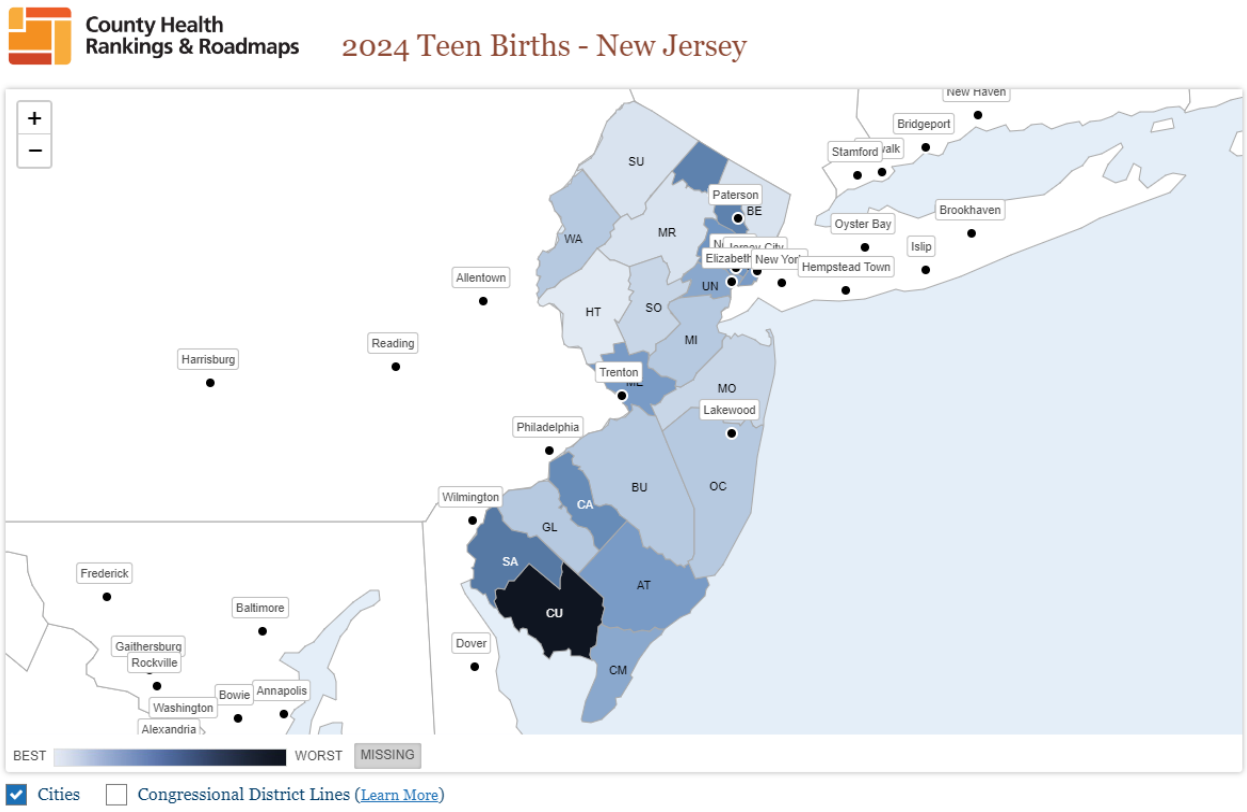
1. National (e.g., high school completion, teen births, mental health providers, etc.)
2. State (e.g., children in single-parent households, income inequality, etc.)
3. County (e.g., children in poverty, unemployment, food environment index, etc.)

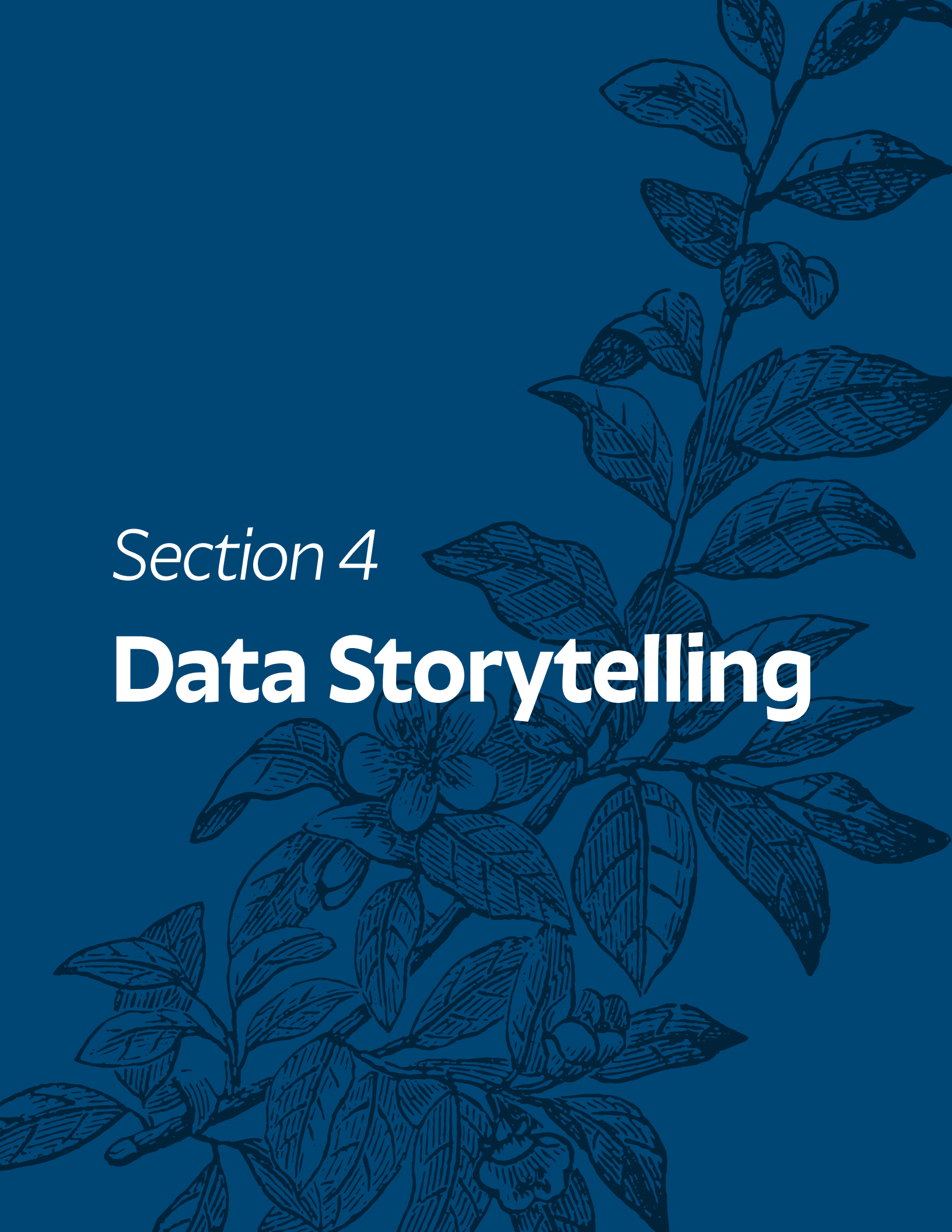
Accessing Data and Visualizations

1. Go to the County Health Rankings & Roadmaps Health Data website.
2. Click a state on the map or use the search bar to find data for a specific state, county or ZIP code.
3. Select a health topic from the drop-down menu to view data by county and/or scroll down on the page to view high-level state data compared to national-level data.
4. Download the map or table visualization as desired. Trend visualizations are available to view and download if a graph icon appears next to the health indicator.

5. To view county-specific data and visualizations, type your county in the search bar. Use the tables to view all data by county, state, and national-level. Download any data or visualizations.
    - Look for the "trends available" indicator for a ready-made county, state, national comparison line graph for a data point.
    - Use the comparison visualization line to show how your county compares to the national and state averages.

Example Map Visualization Reprinted from County Health Rankings





Section 4

Data Storytelling

4. Data Storytelling

This section provides guidance on how to modify the text, arrangement, and color of your data visualizations for optimized storytelling.

The best data visualizations will tell a story, and intentional design can help them to do so. As you develop or download your data visualizations, use this guide to modify them for optimized story telling. This guide was adapted from the *Data Visualization Checklist* created by Stephanie Evergreen and Ann K. Emery in May 2016 and the *Let it shine! Let it shine! Using Data Visualization to Effectively Communicate Evaluation Results* presentation designed and facilitated by Genevieve Martínez-García at the Teen Pregnancy Prevention Conference, Baltimore in 2016, on behalf of Healthy Teen Network. It provides guidance on text, arrangement, and color.

Use of this guide is not all or nothing; rather, each element you include will enhance the story your visual is able to tell. What is most important is that your visuals add value and clarity, and this guide should optimize this objective.

Individual chart elements should work together to reinforce the overarching takeaway message. Choices about visualization type, text, arrangement, and color should reinforce the same takeaway message.

4.1. Storytelling Through Text

Text is an important tool to help you tell the story of your data. The text around your visualization should provide context, but does not need to be the entire story you hope to share: as you discuss your visualizations, you will have a chance to highlight significant findings and provide background information. It's important to keep text clear and simple. The guidance below can help you leverage text effectively.

Use readable fonts.

Use consistent fonts that enhance readability, such as serif fonts (e.g., Times New Roman, Garamond, Cambria) for body text and sans-serif fonts (e.g., Calibri) for headings.

Make sure text size is hierarchical and readable.

Ensure text sizes are hierarchical—titles largest, followed by subtitles, annotations, labels, and axis labels. Axis labels should be at least 9-point font on paper and 20-point on screens.

Keep text horizontal.

Titles, subtitles, annotations, and data labels should be horizontal for easy reading. Line and axis labels can deviate if necessary. Consider switching graph orientation (e.g., from column to bar chart) to make text horizontal.

Add short, descriptive titles.

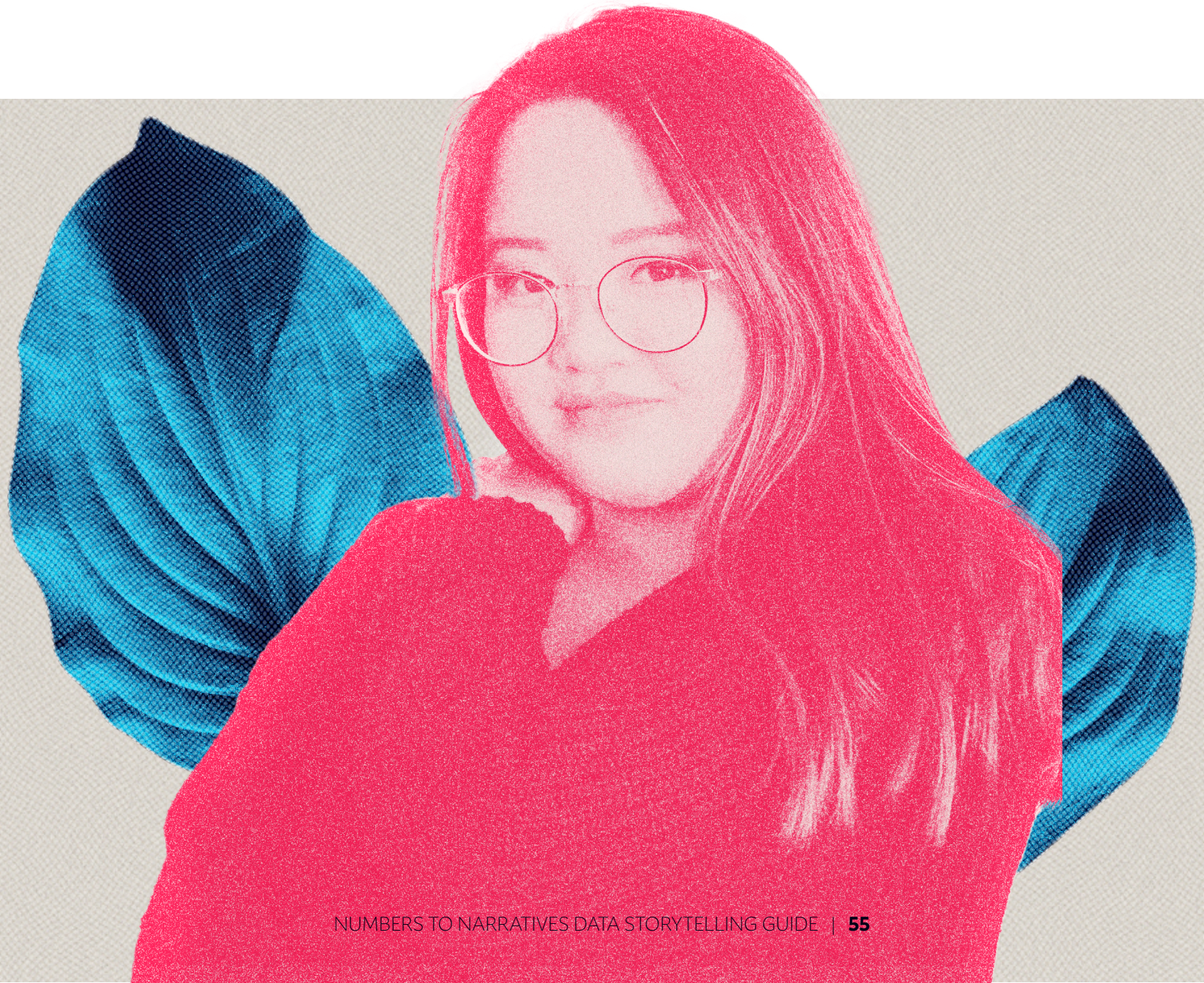
Use a 6–12 word descriptive title, left-justified in the upper left corner. Include key information needed for context, like the year or region represented by the data. Descriptive titles help readers quickly grasp the key takeaway.

Use subtitles and/or annotations to provide additional information.

Add subtitles and call-out text within the graph to provide additional information and highlight key data points. Use them to answer questions a viewer might have or to highlight one or two data points.

Label data directly.

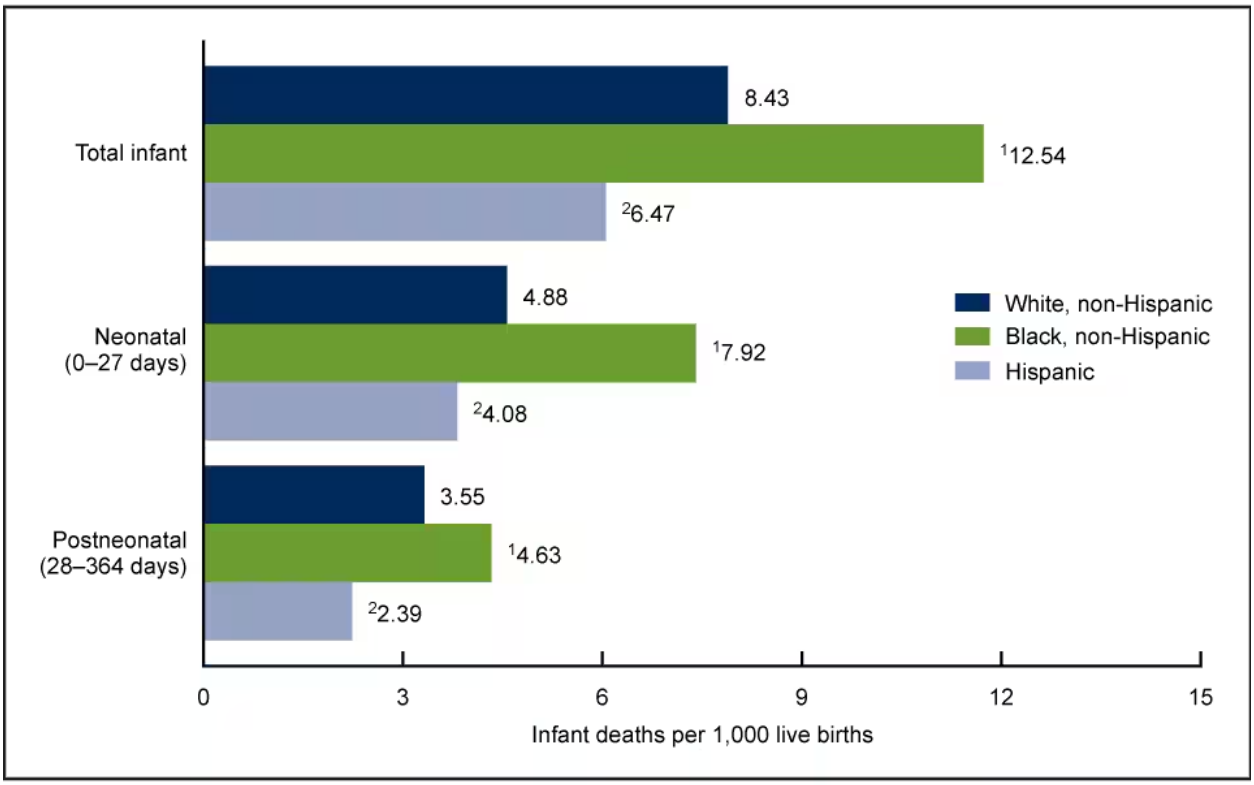
Position data labels near the data, avoiding separate legends to reduce eye movement and improve interpretation. Avoid redundancy by labeling selectively,



Example of Using Text for Storytelling

This example reprinted from Woodall and Driscoll (2020) is a good example of how text can help a data visualization to tell a story. Consistent font is used throughout. The title, though longer than recommended, is descriptive and left-justified in the upper left corner. It provides all of the context one would need to interpret the visualization independently, including the years, region and primary data represented as well as any data segmentations like race. These race segmentations, as well as their color coordination, are clearly labels with call-out text. All text is horizontal for easy reading. The rates that the bars represent are positioned consistently near the bars.

Figure 2. Mortality rate of infants born to mothers aged 15–19, by age at death and maternal race and Hispanic origin: United States, 2017–2018



[1]Significantly higher than non-Hispanic white and Hispanic infants ($p < 0.05$).
[2]Significantly lower than non-Hispanic white and non-Hispanic black infants ($p < 0.05$).

4.2. Storytelling Through Color

Color is another useful tool that can be used to alert the viewer about what is important and needs attention. Color is not decoration, rather an essential signal of meaningful differences in the data. When you are adding color ask yourself, "What purpose will this color serve?" and add color only when it will serve a useful purpose for storytelling. Select an intentional color scheme and leverage it to draw attention to key data points and maintain good contrast between text and background.

Choose an intentional color scheme.

Consider adjusting the default color scheme and choosing one that represents your community. Keep culture-laden color connotations in mind.

Use color to highlight key patterns.

Color should be used to highlight meaningful data points. Use dark colors where you want to draw the eye and light gray to hide less important information or visuals, like gridlines or supporting data.

Consider accessibility.

Ensuring legibility in black-and-white prints and for colorblind viewers. Avoid red-green and yellow-blue combinations when those colors touch one another. Use tools like Color Brewer for suitable schemes.

Ensure color is legible when printed in black and white.

Test printing to be sure that, when printed or photocopied in black and white, the viewer can still see patterns in the data.

Ensure text color sufficiently contrasts background color.

Ensure that there is sufficient contrast when placing text over colored areas, such as a text box. For best contrast, stick to black and white elements. Black/very dark text against a white/transparent background is easiest to read.

Example of Using Color for Storytelling

Color is used well in this example reprinted from Krass, 2022 to show trends and create a narrative around access to confidential family planning services for minors after Title X rule changes. It has an intentional color scheme; red tone is used to show where there is no access and the blue is used to show where there is access, allowing the reader to quickly observe access trends. Rather than using four different colors, the author uses a darker red and darker blue to indicate where a change has occurred which highlights an additional pattern beyond the first, without compromising it. The colors are accessible to a colorblind reader and are purposeful, with clear implications for storytelling.

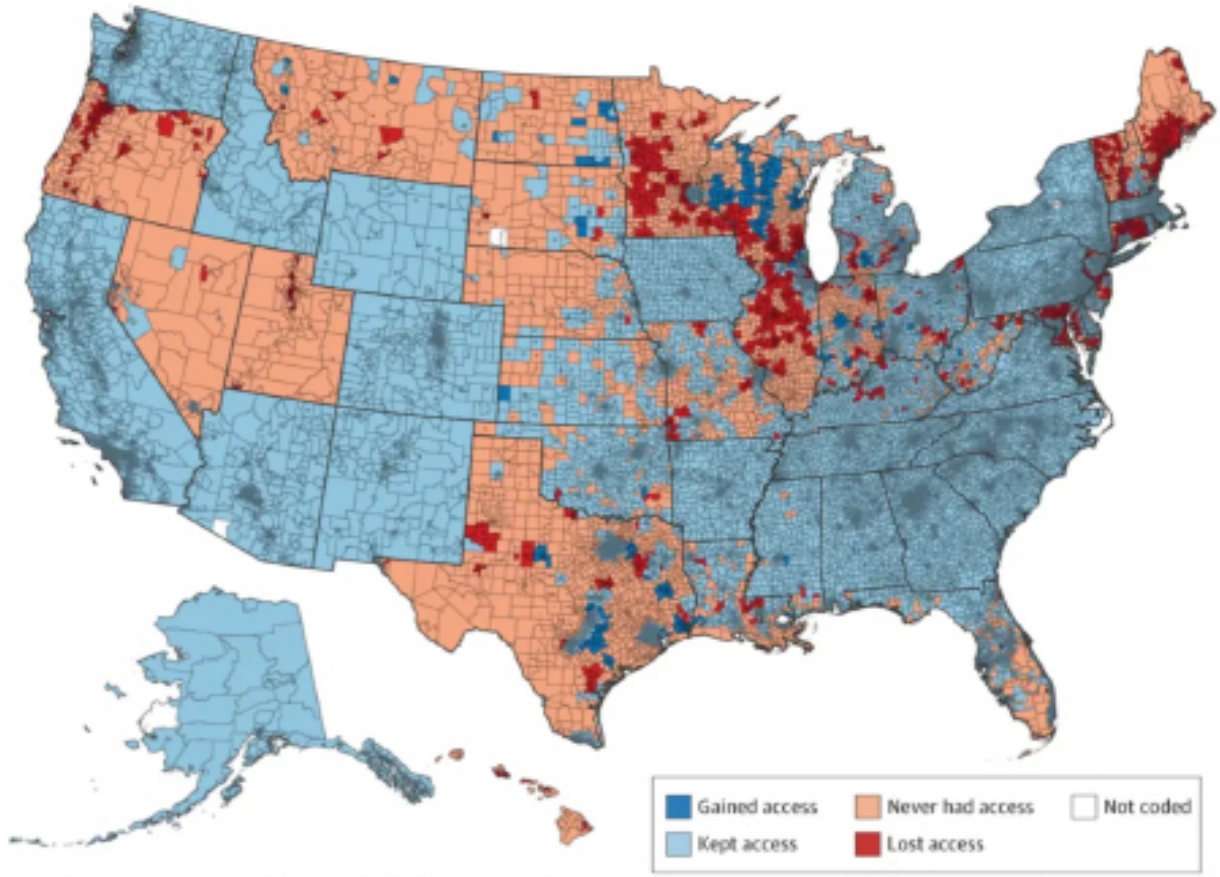


Figure 1: Access to Confidential Family Planning Services for Minors After the Title X Rule Change, by U.S. Census Tract. Source: Krass et al JAMA Network Open, 2022

4.3. Storytelling Through Arrangement

How you arrange your visualization can have a profound impact on clarity and readability. Consider how your viewers will analyze the graphic and what elements will add value as opposed to distract.

Consider The Gutenberg Diagram.

The Gutenberg Diagram tells us that most people in the United States will follow a similar skimming pattern. To optimize positioning, place important information in the upper left and lower right corners. Avoid placing key graphics in the upper right or lower left corners.

Ensure proportions are accurate.

Visual proportions should match the underlying data. A viewer should be able to take a ruler to measure the length or area of the graph and find that it matches the relationship in the underlying data. Additionally, axes should start at an appropriate point (e.g., zero or the beginning of a meaningful pattern).

Order data intentionally.

Data should be displayed in an order that makes logical sense to the viewer. Data may be ordered by frequency counts (e.g., from greatest to least for nominal categories), by groupings or bins (e.g., histograms), by time period (e.g., line charts), alphabetically, etc.

Make graph two-dimensional and clear decoration.

To maximize visibility, avoid three-dimensional displays, levels, and other distortions. Keep visuals free from unnecessary decorations, using icons only if they aid interpretation.

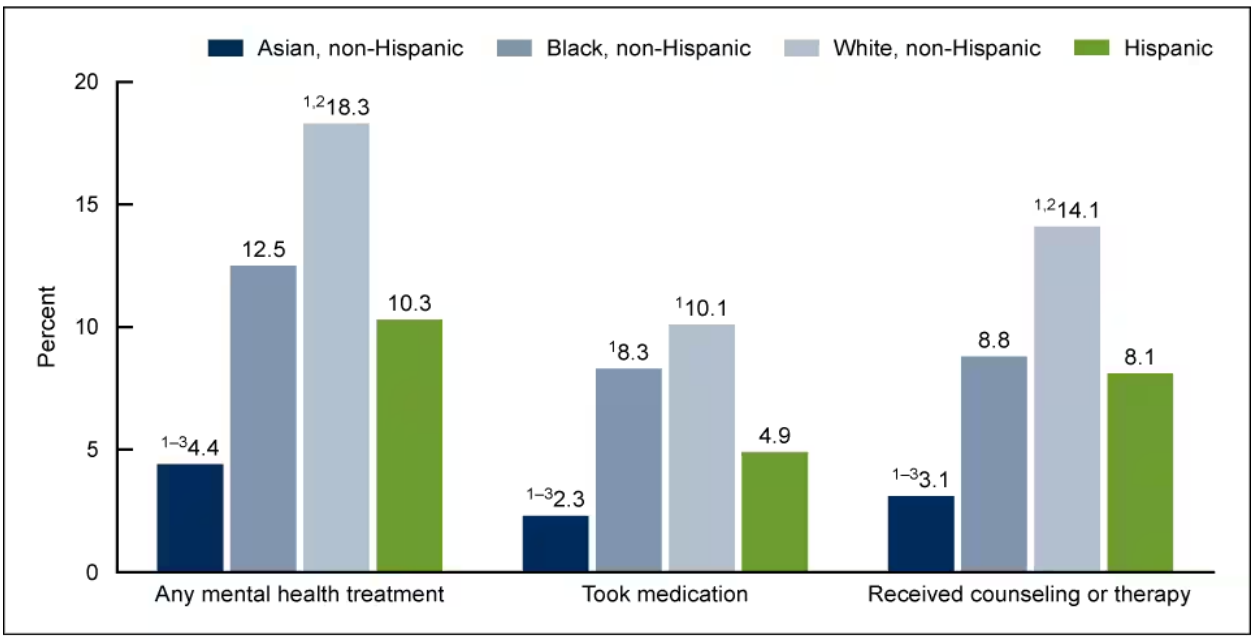
Leverage axes where relevant.

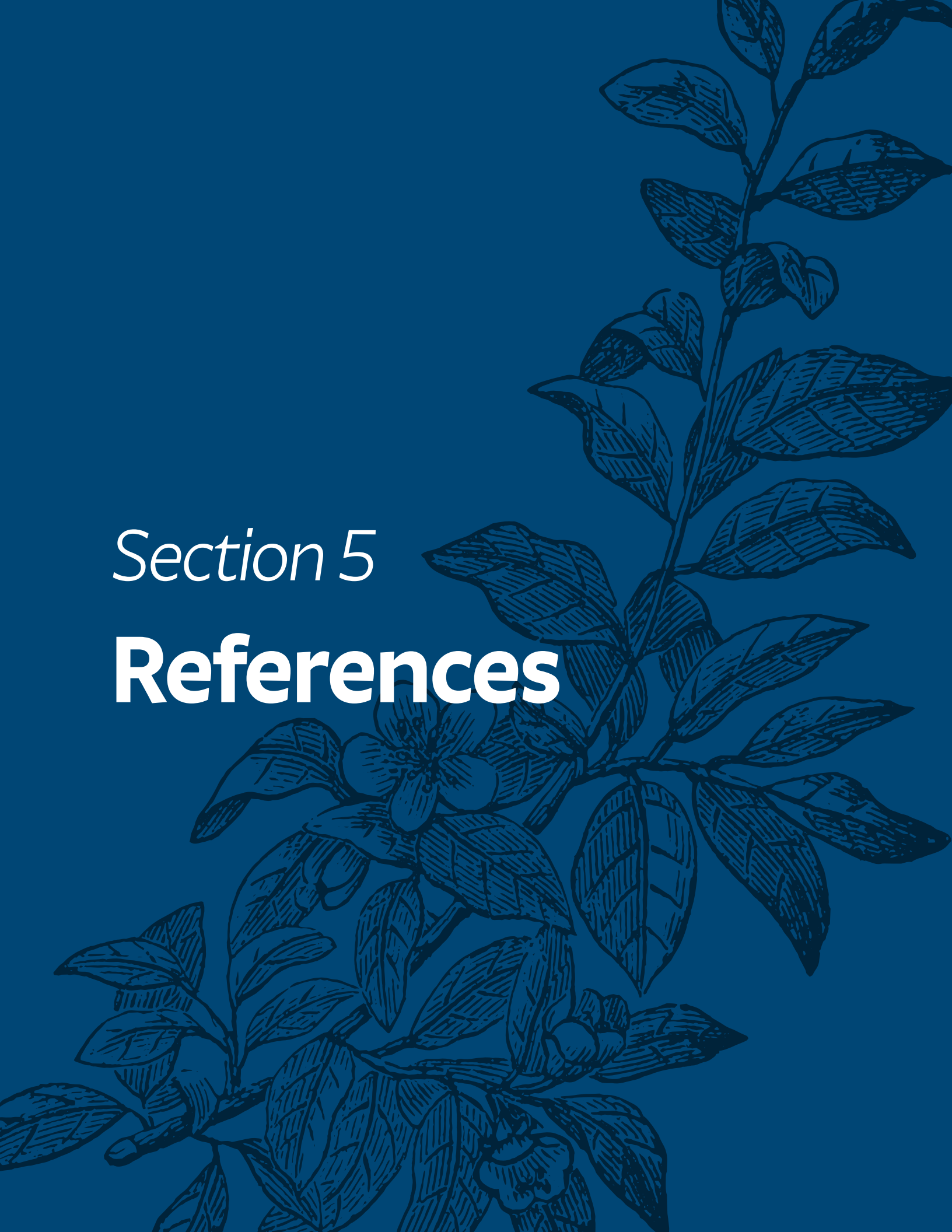
Visualizations should only have one horizontal and one vertical axis. The spaces between axis intervals should be consistent using the same unit, even if every axis interval isn't labeled. Axes should not have unnecessary tick marks. For example, tick marks are useful in line graphs but unnecessary in bar charts.

Example of Using Arrangement for Storytelling

In this example reprinted from Zablotsky and Ng (2023) one can see the effect that arrangement can have on storytelling. By choosing this arrangement, the authors have constructed a story about race-based discrepancies in mental health treatment for children aged 5-17. Proportions are accurate and consistent with the underlying data. Axes start with zero, rather than with the first data point of 2.3%. The data is ordered consistently by race and across treatment types. The graph is two-dimensional and clear of any unnecessary decoration. Axes and color labels are clearly labeled and spaced.

Figure 3. Percentage of children aged 5–17 years who had received any mental health treatment, taken medication for their mental health, or received counseling or therapy from a mental health professional in the past 12 months, by race and Hispanic origin: United States, 2021





Section 5

References

5. References

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