

# Data Visualization Webinar Series

Richard Russell  
Health Communications Specialist  
Division of Reproductive Health, CDC

Nicole Davis  
Epidemiologist  
Division of Reproductive Health, CDC

---

August 16, 2018  
3:00PM



1. Reaching your audience
2. **Developing your content**
3. Designing your concept
4. Presenting your creation



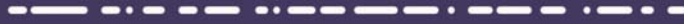
## Homework list

**Webinar 1:** Determine team objectives, scope, audience, and story (*Due Aug 9<sup>th</sup>*)

**Webinar 2:** Create one example of each type of chart/graph and build a mock-up PPT presentation (*Due Sept 20<sup>th</sup>*)

**Webinar 3:** Add design elements and final messaging to created graphs; prepare final infographic for sharing (*Due Nov 1<sup>st</sup>*)

**Webinar 2:  
Data visualization to Infographic**



1

Which type of graph or chart makes sense?

2

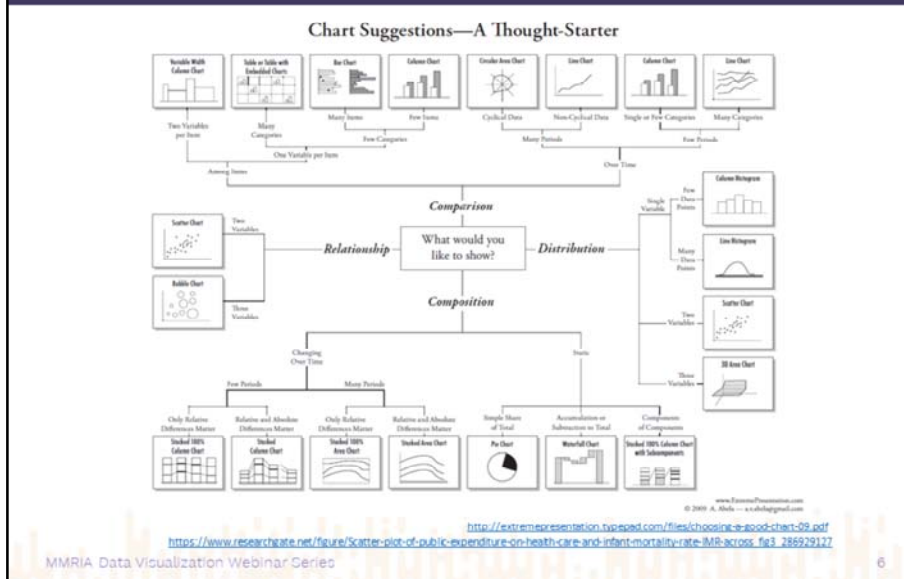
Basic data viz or infographic?

3

Tips &amp; tools for better PowerPoint slides

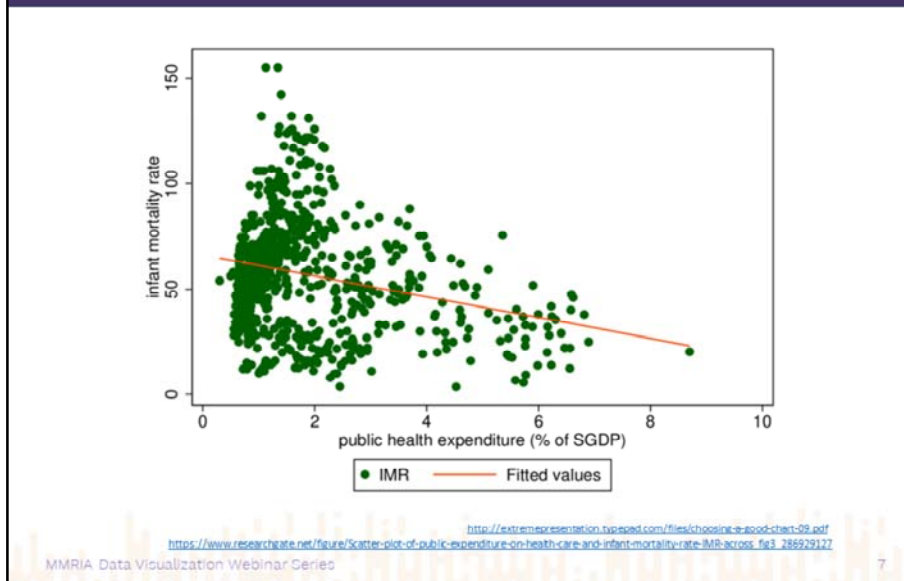
Our 3 big objectives for today are:

- When is a line graph better than a bar chart or pie chart?
- Will a basic chart work just fine or should you go in for an infographic?
- There's no need for PowerPoint slides to be painful



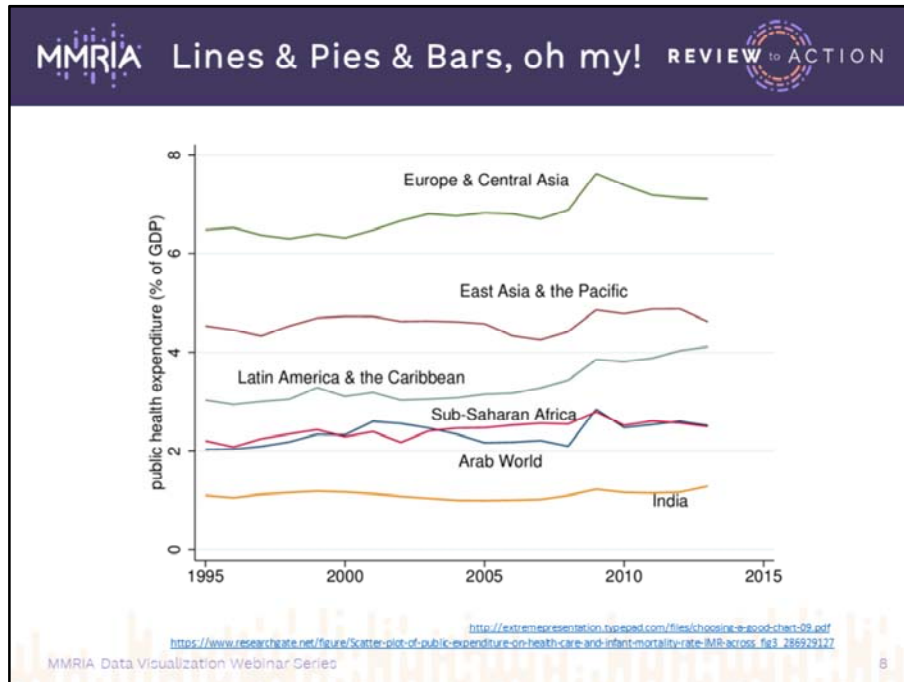
Obviously, there’s a lot of data out there, and it feels like there are just as many ways to show it. One of the resources at the end of this deck mentions 14 types of graphs and charts, and explains how and when to apply them. In the years I’ve been at CDC, I can easily say I haven’t formatted even half of those, though I’ve seen all of them used at some point.

Epidemiologists may need to employ many types of displays depending on the complexity of the data, but for the purposes of this webinar we’re going to narrow it down to just a few of the most commonly used and most easily understood types. We’re limiting our scope today primarily for one reason: your audience.



Here’s an example titled “Scatter plot of public expenditure on health care and infant mortality rate (IMR) across India states, 1981-2012, with a linear regression line.” It’s found on researchgate.net.

I’m not trained as a scientist or statistician, but I’ve been in this field long enough to recognize that this is complicated data. Frankly, the lay-person in me is a little intimidated because I don’t immediately get it. I only read part of the article, and I realize it’s out of context sitting alone on this slide, but it doesn’t provide me with a quick grasp on the subject. I also to know it isn’t intended for that; it serves a particular purpose for a particular audience.

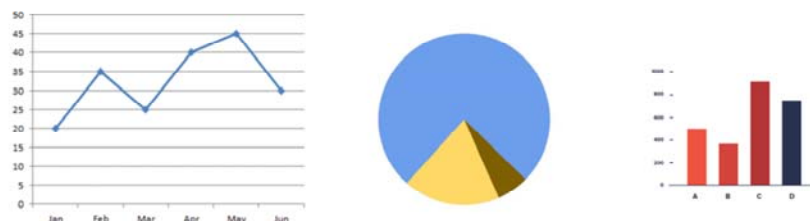


In contrast, this line graph from the same article makes sense with only a cursory glance at the X and Y axis labels. I didn't need to read the details in the article to understand what this one is relaying. And often, many audiences want quick, easy-read facts. Instant gratification.

So we're going to go into the three most commonly found types of basic visualization: Line graphs, pie charts, and bar charts. Then we'll talk about whether charts and graphs or an infographic work better.

In the interest of time today, and because we're assuming each team has at least one member who has experience building charts in Excel or PowerPoint, I'm not going into the technical nitty-gritty of making each kind of chart. We're going to give a big-picture view of best practices for clarity and comprehension. A quick Google search will turn up dozens and dozens of graphing tutorials available online, and they all give pretty much the same information.





Until pulling this webinar together, I'd never thought much about there being a difference between a graph and a chart. Verbally, kind of like the terms data viz and infographic, there is and there isn't a huge separation. But there are a few technical points that divide them:

- **plots** – data points marked on a coordinate matrix
- **graphs** – use lines drawn between points to show relationships in the data
- **charts**– can **include** line graphs, but usually use other shapes or objects. Bars or pie wedges are relevant to us today but others, like bubbles, are common.

Best for tracking in timeline format or trends in a continuous progression

- Keep time intervals consistent: use all years, months, quarters
- Keep tick marks and gridlines to a minimum



MMRIA Data Visualization Webinar Series

10

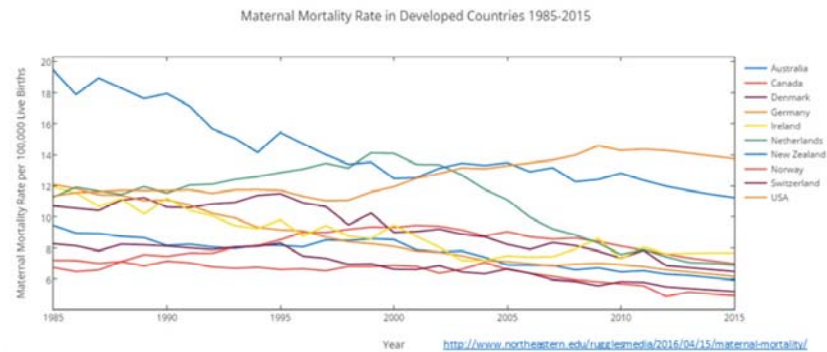
Here's exactly what a **line graph** is ideal for: showing relationships across continuous sequences or progression (like time periods or age ranges.)

- Consistent intervals keep plotting accurate and the results easier to follow, so for example, mixing years and months will show irregular trends.
- Limiting the tick marks on the axes, as well as gridlines in the background, help reduce clutter and confusion.

If you're only graphing one point with one line, avoid redundancy – you don't need a legend to tell viewers what the line means.

Excellent for minute changes and numerous data points

- Limit number of lines (4-5 are ideal)
- Use bold colors that are easy to distinguish from each other
- Use solid lines as much as possible; if dotted or dashed lines are used, increased the line weight



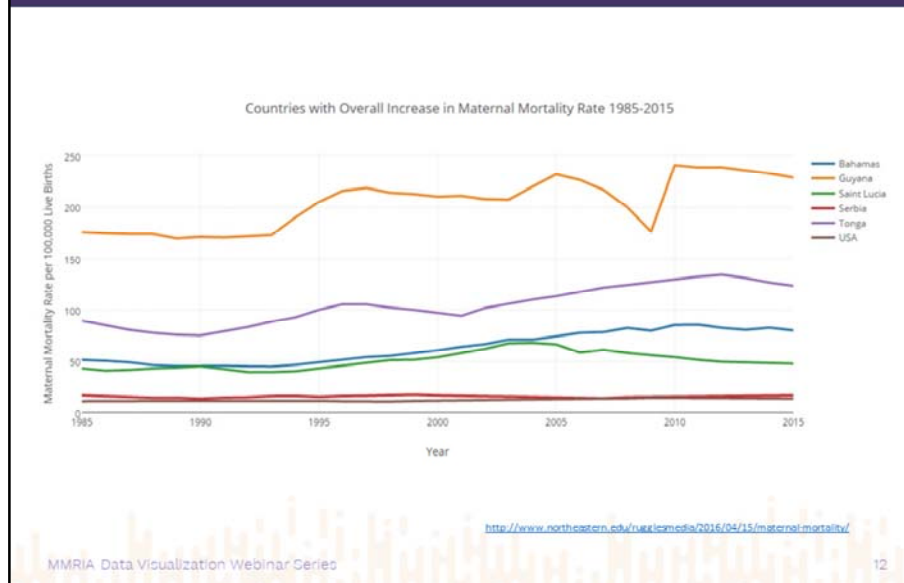
Line graphs are wonderful when you have lots of data points or tiny changes in range. While they're also excellent for comparing many different groups or areas, etc. Try to keep the number of categories/lines down to 5. Beyond that, viewers may have trouble distinguishing lines from each other if there's an overlap.

This example shows ten countries, and it's easy to see where the information gets tangled.

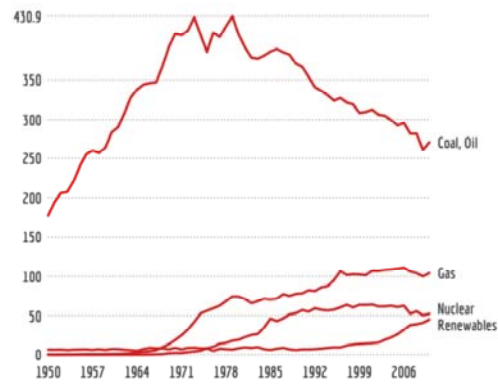
This one's also a fine example of why not to use yellow as a line color. Another reason for limiting the number of lines becomes obvious in this graph: you're forced to use more similar colors. I have very good color vision, but here, I can't tell the difference between Germany/USA, Switzerland/Denmark, or New Zealand/Australia. While they're usually discouraged, this is a situation where the use of dashed or dotted lines would make sense.

One side-note on color that's a good practice across all chart types: if you're

creating multiple charts or graphs showing different aspects of the same data categories, keep those category colors consistent throughout. For instance, you create a Figure 1, in which A=orange, B=red, C=dark red, and D=purple. When you go to build Figure 2 and Figure 3, match those same colors for A, B, C, and D every time.



Here's a better example from the same report as the previous graph: fewer lines and more distinct colors showcase the information much more clearly.

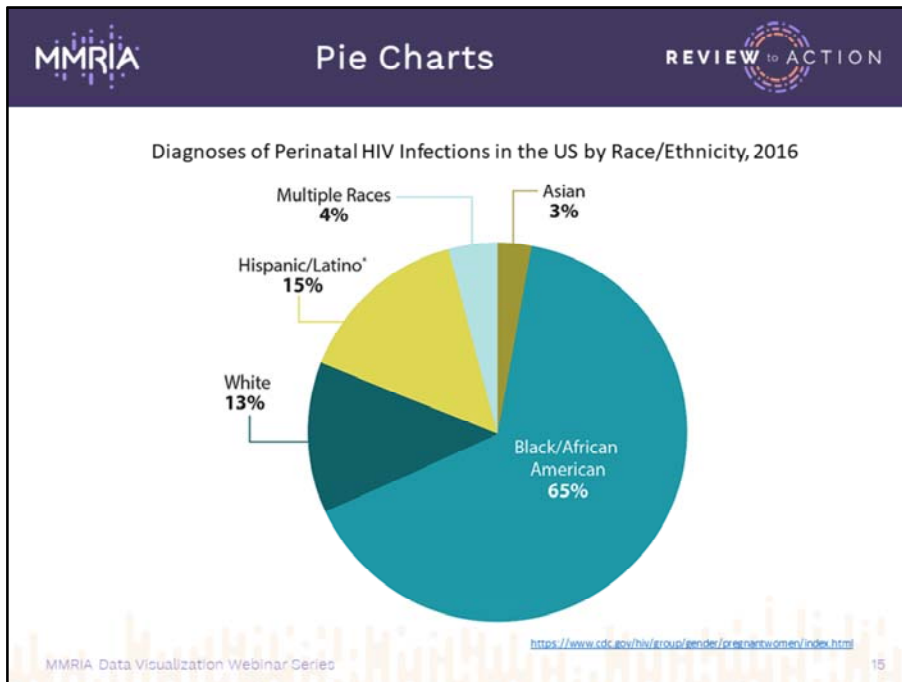


<https://www.vis4.net/blog/2012/06/doing-the-line-charts-right/>

If you're following the 5-or-less-lines rule, think about labeling lines instead of using a legend. No need to use multiple line colors and no one has to look back and forth to keep track of which one is which.



Line graphs can be paired with other chart types, but this can end up being confusing to many viewers.



A lot of people have a love/hate relationship with **pie charts**, citing a distorted display of proportions and lack of fine detail. This is one reason they're not often published in journal articles, but data visualizations and infographics are good places to use them because they're more familiar to the general public. In spite of the critics, they do some things better than line graphs and at least as well as bar charts.

Take note of the colors on this chart, which we'll talk about with the next slide.



- Use pies to show parts or composition of a whole (NOT for comparing data)
- Limit the number of slices to 5-6
- Work clockwise: insert largest percentage first (12:00) and work down/around
- Make sure all your data adds up to 100%
- Avoid rainbow/auto-color schemes

One thing pie charts do beautifully is to show portions of a category; percentages of a single topic such as racial or ethnic breakdowns are one example as we saw in the previous slide. They don't work for comparing categories to each other. (We'll show why shortly.) And they're not useful for showing sequential data like line graphs are.

Because most folks can't easily interpret the smaller wedges in a crowded pie, more than five or six values become burdensome. Other types of charts show larger amounts of data more effectively. You might group all the smaller percentages into an "Other" category (let's say everything under 10%), and break these out separately, if they're important. We'll show an example of this shortly, also.

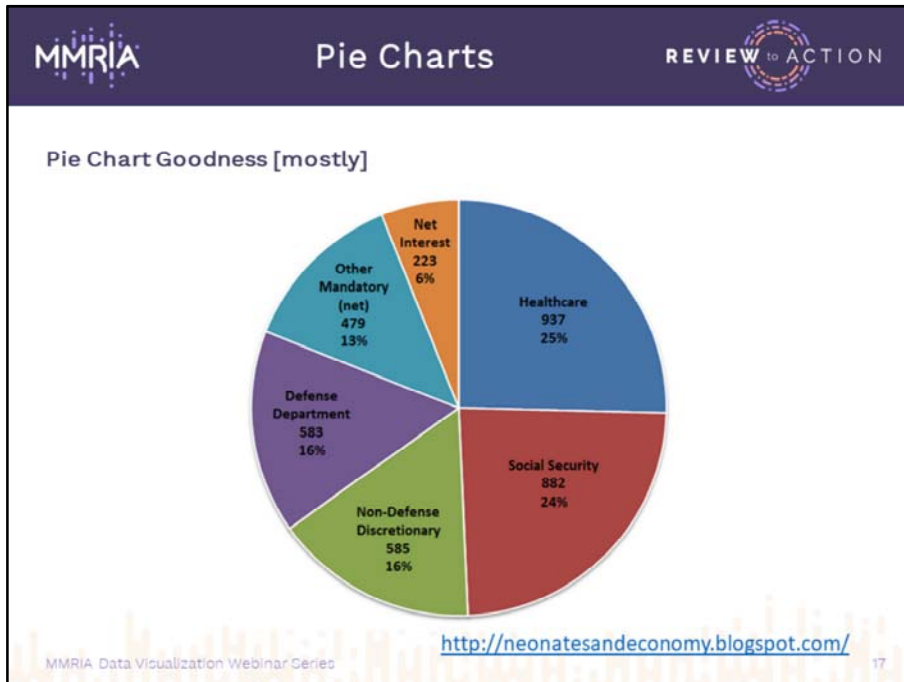
Think of a pie chart like a wall clock: your largest data should start at noon and flow around clockwise, rather than be scattered across the circle. When building a pie chart, just place the data in largest-to-smallest order so the slices shrink as they go around. (45%, 25%, 15%, 10%, 5%). Counterclockwise works, too. Just enter the data in order.

Work out your math ahead of time! Your data should always show 100% - no more, no less!

On the previous slide, I mentioned the colors. PowerPoint and Excel graphing systems usually auto-fill colors when you make a pie chart, but you can select your own in the

control panel. In our next webinar I'll go into color use in more detail, so for now, try to create a clear, easy-on-the-eye palette of colors rather than using the whole spectrum (you only need five or six). This can help viewers focus overall, and especially on the smaller segments. It's also really important for people with color blindness, which we'll also discuss next time.

At the end of the deck there's a link to "Save the Pies for Dessert", a fun article by Stephen Few, listing his pros and cons of pie charts.



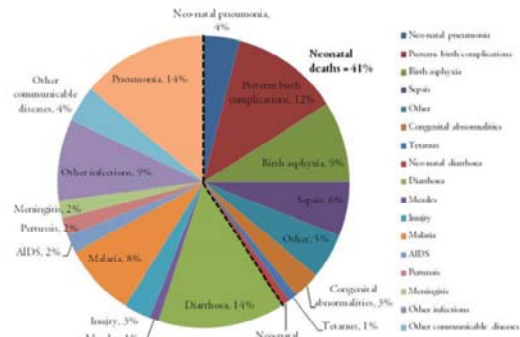
Here, data flows clockwise largest to smallest, and it adds up to 100%.

Again, notice the colors in this one. They were probably randomly generated but they're relatively in the same value range (dark and muted) so your eye isn't bouncing back and forth too much, as it might between light and dark colors. The white lines between the wedges are unnecessary, but that's me being judgy, and there's no hard/fast rule that I've ever seen.

My biggest complaint here is the data labels: the segments are labeled by category, with quantity AND percentages, so there's absolutely NO numerical mystery. But the data points are hard to read because of the dark type on dark colors. White type would have helped here, or placing the labels outside the chart if space allows.

## Pie Chart Badness

## Global causes of child deaths



Pie chart derived from data in Black RE, Cousens S, Johnson HL, et al. in "Global, regional, and national causes of child mortality in 2008: a systemic analysis," The Lancet, May 12, 2010.

MMRIA Data Visualization Webinar Series

18

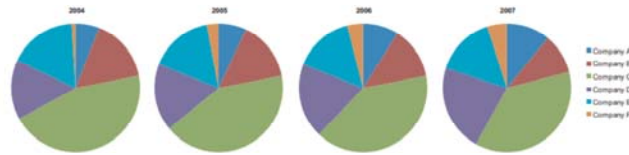
Here's a great example of NO! As with line graphs, fewer is better. This one's a huge mess: 17 categories; the data was loaded in random order (I'm not even thinking about checking the math); they've used both a legend AND data labels for each slice, which fall inside and outside the pie; there's dark text over dark colors.

It hurts my eyes and I've lost interest in trying to decipher their story.

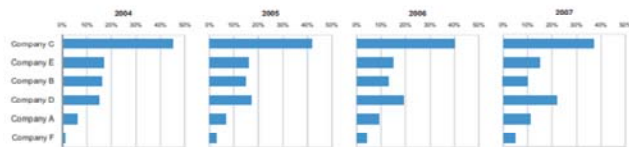


read visualizations. But pie critics say that with the center missing, they distort perception of data even further.

## Pie Chart Badness, continued



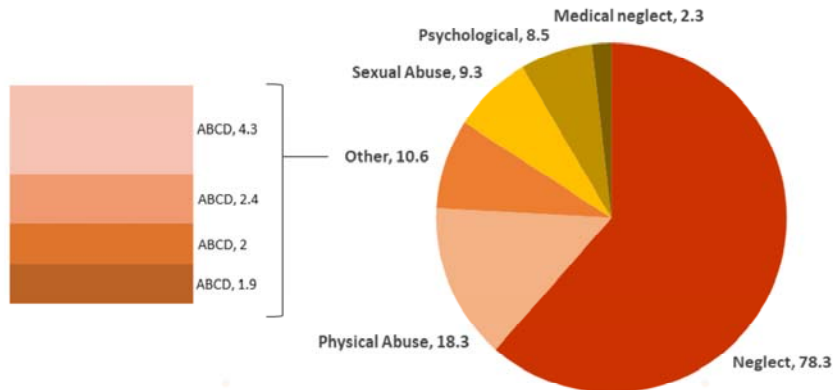
VS.

<http://www.perceptualedge.com/articles/08-21-07.pdf>

As a whole, that last slide kind of shows one more pie chart no-no: using them to compare multiple data sets. Pies are good one at a time, but trying to keep track of the categories and data points across several becomes frustrating for most viewers. Horizontal bar charts, shown here, or stacked bars (sometimes), as we'll see next, are better suited for this task.

## Pie + Bar Chart Combo

Using stacked bar chart with a pie:

Pie chart recreated from <http://www.acf.hhs.gov/programs/ct/resource/child-maltreatment-2012>

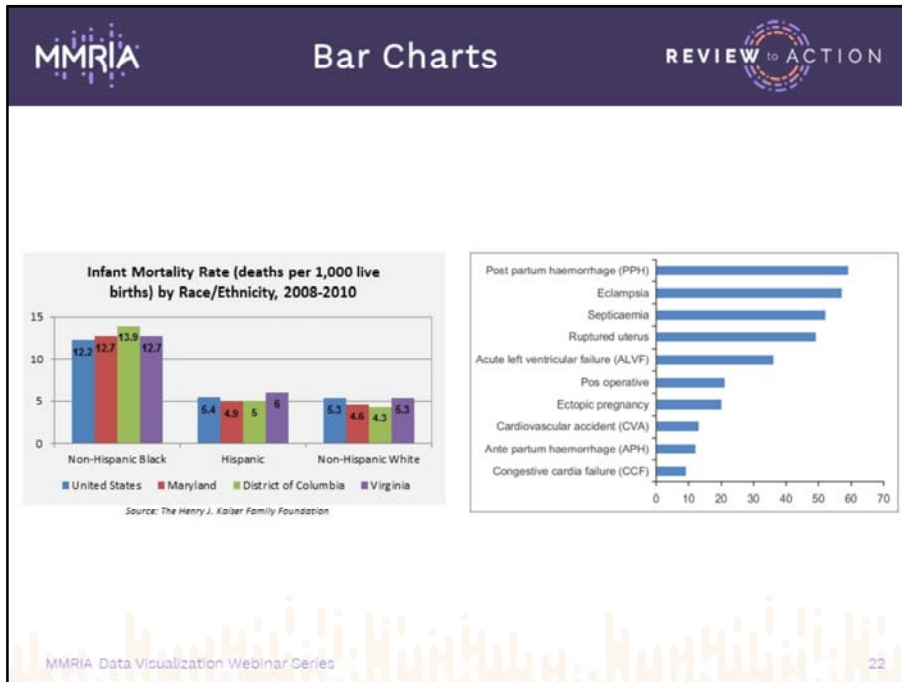
MMRIA Data Visualization Webinar Series

21

Here's the other work-around I mentioned for some pie chart fails. This is one way to highlight finer data if you have an "Other" category in your pie chart. This technique is not commonly employed, and usually only **IF** the minute data really deserve close attention. This could also be achieved simply using an asterisk and listing the smaller percentages in a footnote.

I haven't found an automated graphing feature for this, yet, so I had to build these separately and combine them. If you know a different approach, I'm all ears.





Since **bar charts** have already been showing up in pie chart territory, let's move along and see what they're all about.

Bar charts have a huge range of display possibilities, and can show fairly large amounts of data, either individually or by comparing multiple groups within a category. Since each item within a category gets its own bar, it's more obvious to viewers what they're looking at.

Like line graphs, they allow us to show timelines or other sequences and progressions. They're very effective for breaking down portions of a whole, as pie charts do.

They also give us the option to display data horizontally or vertically. Vertical bar charts are easier to read and understand for most people, but they aren't always the way to go. Horizontal bar charts work better when you have to show more categories or longer data labels.

- Minimize gridlines in background
- Zero out
- Y axis = vertical, X = horizontal, mostly
- Maximize chart space (axis control)
- Shorten axis labels for better readability
- Use legends or labels

As with line graphs, grid lines can be distracting, so if they have to be there, minimize them as much as possible by using only the primary verticals and making them light gray.

Unless you're showing (and explaining) very specialized data, your Y axis labels should start at Zero to be sure your chart shows relationships correctly.

Personally, I never remember which axis is which (to help: the letter Y is taller than the letter x.) In vertical bar charts, Y is the left axis, showing values: quantities, rates, etc.; X is across the bottom, usually for categories. But these axes swap out if you're using a horizontal chart.

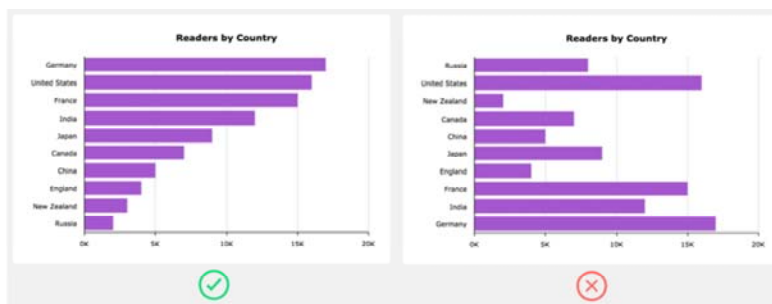
Maximize chart space for infographics: Keep the Y axis relevant to the value of your largest data point. That is, if your highest number is 6.5, and your axis maximum is set at 10, your data will only fill 2/3 of the chart. However, this does not apply if you're creating a series of bar charts with different maximums but need to show relatedness across the series. In this case set them all to the highest max for consistency. You can adjust the axis displays in your chart controls.

Axis labels can take up a lot of space on a chart, like big budget figures up the Y axis, or long town names, risk factors, and other terms across the X axis. As much as you can, condense

or abbreviate these labels to save space and avoid having to rotate them to fit.

Be sure viewers can keep track of categories. Labeling bars or using a color legend makes this easy.

- Order data logically for better readability
- Watch your colors

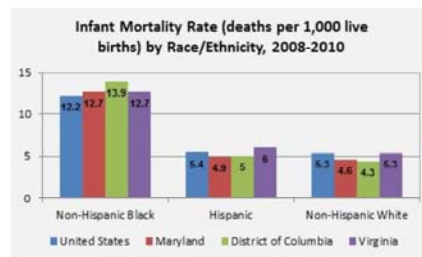
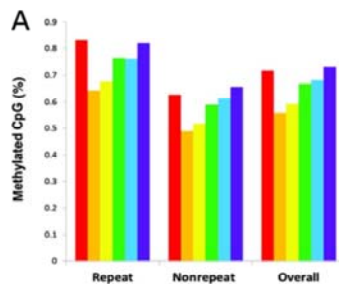


Like pie charts, bar charts are easier to read when the data is entered in a logical order: highest to lowest quantity, let's say. The chart on the right feels haphazard, and several bars look so similar in size it's hard to gauge the leader. But this isn't always going to be the case: if you're showing time progression across months, or need to place data in prioritized categories (regions, causes, etc.) follow the system that makes the most sense and be consistent if you're building multiple charts.

You don't have to make each bar a different color, and it's usually easier on the viewer if you don't. When making a single point, such as mortality rate from a single cause, you only need one color.

Source: Google Image search

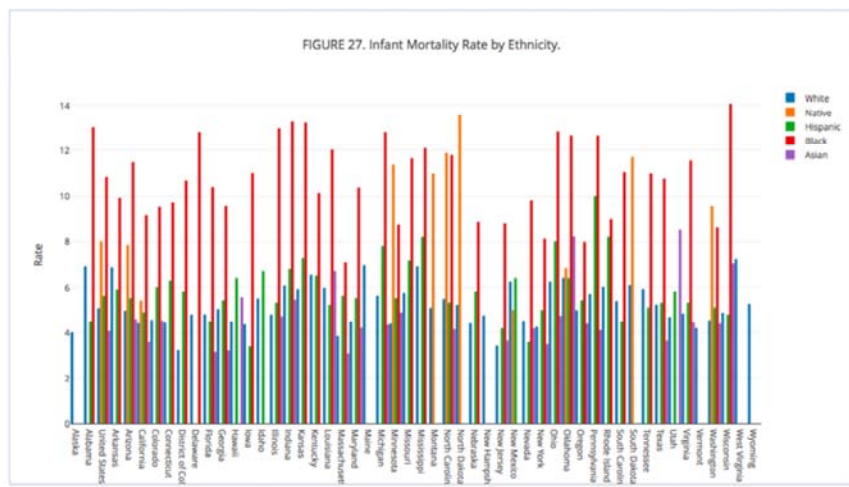
- Watch your colors
- Skip the 3-D and special effects



Only combine colors if you're comparing data. And just like with pies and lines, use color kindly. I'll let you decide which one here did that.

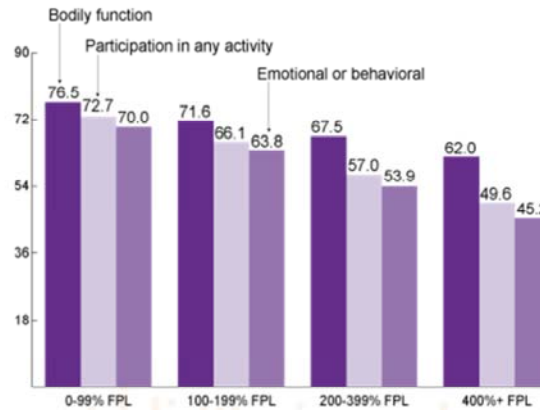
Also as with pie charts, don't go for 3-D, beveled edges, or other special effects.

Source: Google Image search



Bar charts are better than others at showing more data, but please, be nice to your viewers. Use good judgement when deciding how many points you need to show at once. As with the others we've talked about, 5 is *always* a great place to stop. This example might make a nice poster; a very large poster.

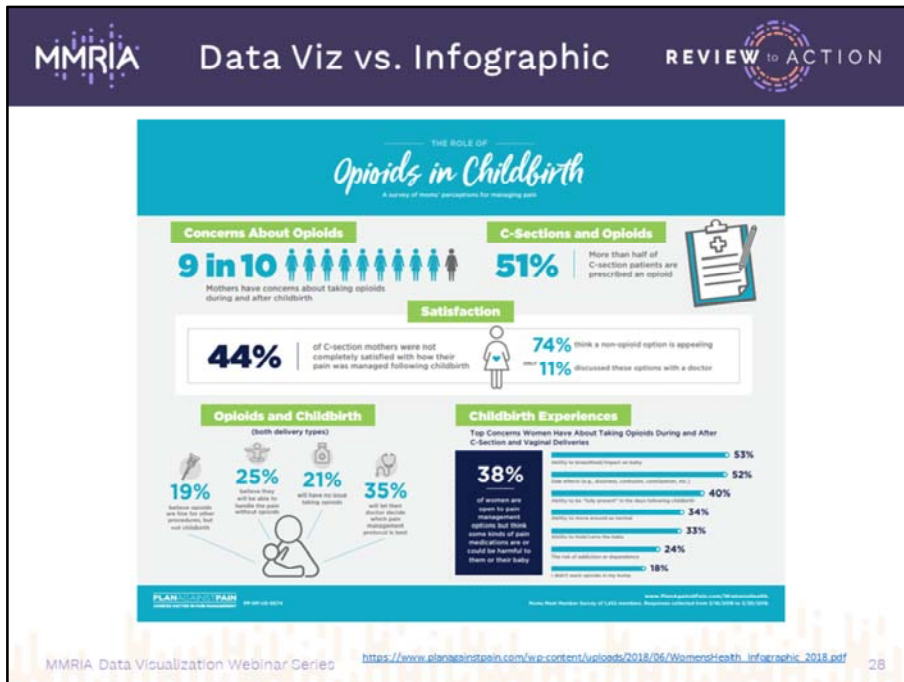
Functional Difficulties Among CSHCN, by Poverty Status



MMRIA Data Visualization Webinar Series

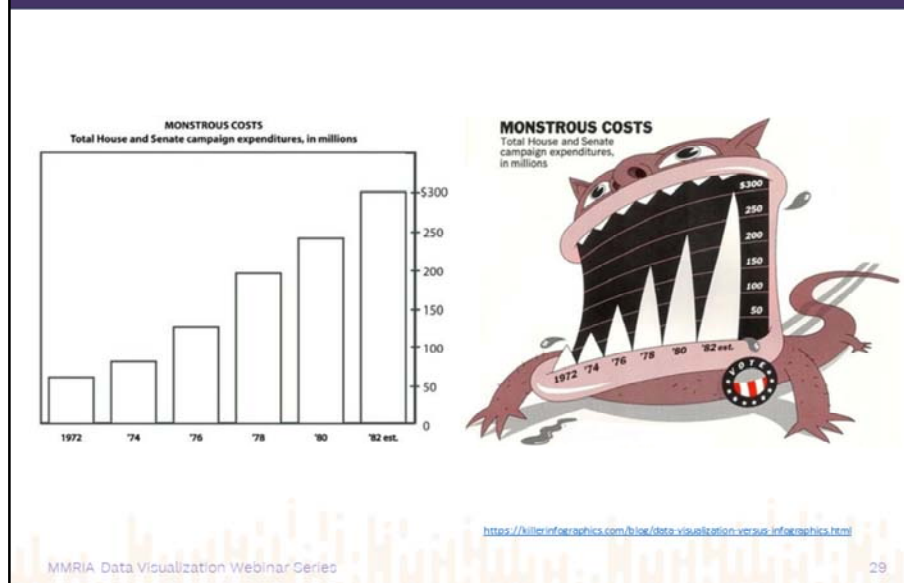
27

Give your info some breathing room. Reduce font sizes for labels when things get crowded. There are better ways to label categories than we see here, and labelling your axes always helps, too. I'm sure there was a logical explanation for the Y axis breakdown, but groups of 18 seem unusual to me, and zero is missing, so we have to make assumptions about our starting point.



Now let's see how these charts and graphs can be made even MORE effective for different audiences.





Same data, different results. But don't be scared.

I wouldn't attempt to make the version on the right, and we're not going to ask you to come up with anything remotely similar. It doesn't say anything different from the chart on the left, but I get a lot more enjoyment from it and I'll remember it. Visualizations of this caliber are not within most people's capabilities, but it's not hard to produce effective and attractive ones yourself.

Let's start by figuring out when and where you need what.

**MMRIA** Data Viz vs. Infographic **REVIEW to ACTION**

Data Visualization	Infographic
<ul style="list-style-type: none"> <li>• More academic arenas</li> <li>• “Formal” contexts</li> <li>• Smaller audience</li> <li>• Health Care Providers</li> <li>• Public Health Practitioners</li> </ul>	<ul style="list-style-type: none"> <li>• Less academic arenas</li> <li>• “Casual” contexts</li> <li>• Wider audience</li> <li>• Health Care Providers</li> <li>• Public Health Practitioners</li> <li>• Policy makers</li> <li>• Advocates</li> <li>• General public</li> </ul>

MMRIA Data Visualization Webinar Series 30

Last month we discussed how your audience is the key to deciding **so much** about presenting your data. But wait! There’s more! Before you can get it out there, you have choices to make about how to format it for better comprehension. Explaining data visually requires looking at it from a different angle.

I’ve never seen any official recommendations, but I’ve broken down some points I always think about when deciding between straightforward charts or a more graphic approach, based on what I understand about the audience receiving the data.

On the left: Among peers and colleagues familiar with the language of science and data, pure charts and graphs are the way to go, especially for formal presentations and journal articles. This will be a more narrow audience, and in many cases they may be the only one you have to focus on.

However, when delivering findings to a wider, more “lay” audience, that

changes. Broadly speaking, for state and local policy makers, most health advocates, and the general public, a different take on things may help. Providers and practitioners fall into both columns, especially those using infographics to help educate their patients.

The slide is titled "Data Viz vs. Infographic" and features the MMRIA logo on the left and the "REVIEW to ACTION" logo on the right. The main content is a comparison between Data Visualization and Infographics, presented in two columns. At the bottom of the slide, there is a decorative bar with a bar chart pattern and the text "MMRIA Data Visualization Webinar Series" on the left and the number "31" on the right.

Data Visualization in	Infographics in
<ul style="list-style-type: none"> <li>• More academic focus</li> <li>• “Formal” context</li> <li>• Fact sheets, one-pagers, and e-mail newsletters</li> <li>• Reports (internal or external)</li> <li>• Websites &amp; blog posts</li> <li>• Presentations</li> <li>• Press releases</li> <li>• Journal articles and white papers</li> </ul>	<ul style="list-style-type: none"> <li>• More lay focus</li> <li>• “Casual” context</li> <li>• Fact sheets, one-pagers, and e-mail newsletters</li> <li>• Reports (internal or external)</li> <li>• Websites &amp; blog posts</li> <li>• Presentations</li> <li>• Press releases</li> <li>• Social media posts</li> <li>• Issue awareness promotion</li> </ul>

Regardless who you’re trying to reach, including the appropriate visual elements is going to make your latest findings and statistics stand out more, and it’s an excellent way to educate and/or influence your audience. You can illuminate success stories or spotlight areas that need development or improvement.

On this slide we see big overlaps in the most common documents and situations you’re probably using to convey messaging. Fact sheets, reports, websites, press releases, and slide presentations are all equally strong carriers of standard data viz AND infographics. As always, it just goes back to who’s most likely going to see it.

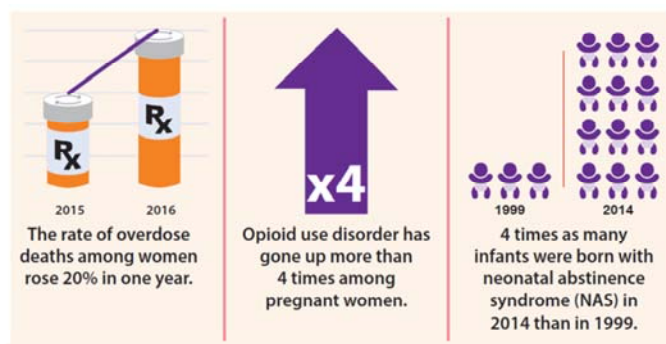
Blog posts are usually topic-specific, so if your state’s or department’s website hosts a blog, check into publishing your visualizations as part of a “vlog” (visual blog).

Point-specific mini-infographics are great PR tools, especially for social media

posts. As punctuation in blog posts or sidebar buttons on a website these can be very effective to link to an awareness month, week, or day, or advertise a related event, like a promoting visits by mobile health testing facilities. When we talk about design next month we'll go over creating segmented visualizations to accompany different parts of the content in your post.

Simple Data = High Customization: (1 comparison or fact)

- Use pictographs and illustrations along with or instead of charts and graphs



To help you decide when to use a regular chart or go graphic, use this simple Rule of 3: does your data viz compare one, two, or three or more things?

Here's **level one**: If you're showing simple data, showing a single data point or one comparison, you can customize pretty freely. Using pictographs as charting elements is a good way to help viewers relate to simple ratios and low quantities. Always keep your visual elements connected to the topic. Next session, when we talk about design, we'll go over some other ideas for choosing and applying images.

These graphics were developed for the August 9<sup>th</sup> MMWR on the US opioid crisis and its effect on pregnant women and infants, For these, I followed basic "safe-graphing" recommendations from one of data viz's gurus, Edward Tufte (reference provided at the end, but not always followed religiously). Creating a real bar chart BEFORE customizing the prescription bottles over it is a good practice because the images have to be correctly proportioned to the data.

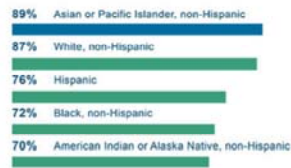
On the right, we wanted to show a comparison of quantity in different years. This was easy, using rounded numbers for the visual, while the report provides the specific figures.

**Medium-level Data - Moderate Customization: (2 comparisons)**

- Use graphic elements with graphs or charts to help convey the story

**On-Time High School Graduation Rates by Race/Ethnicity, 2013-14**

On-time high school graduation rates, defined by the percentage of students awarded a high school diploma 4 years after starting 9th grade, varied among racial and ethnic groups in the 2013-14 school year.



Data source: Common Core of Data (CCD), EDNCS.

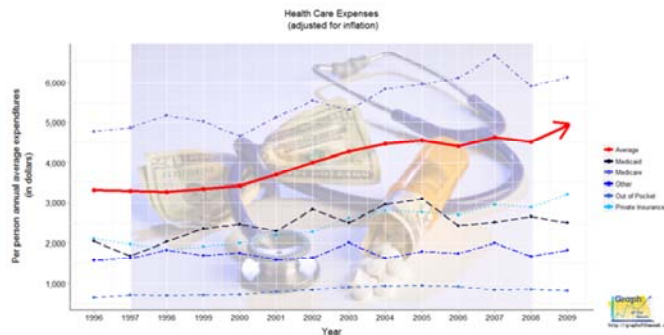
<https://www.healthypeople.gov/2020/leading-health-indicators/LHI-Infographic-Gallery#Jun2016>

**Level two:** For more than one comparison, be judicious when using pictographs or other elements alongside charts and graphs. I'm stretching the rule by showing this one, but it's a really simple, clean example of an icon used to add visual interest within the context of the chart.



**Complex Data = Minimum Customization: (3+ comparisons)**

- Maintain complete chart
- only use a graphic outside data set to complement the story



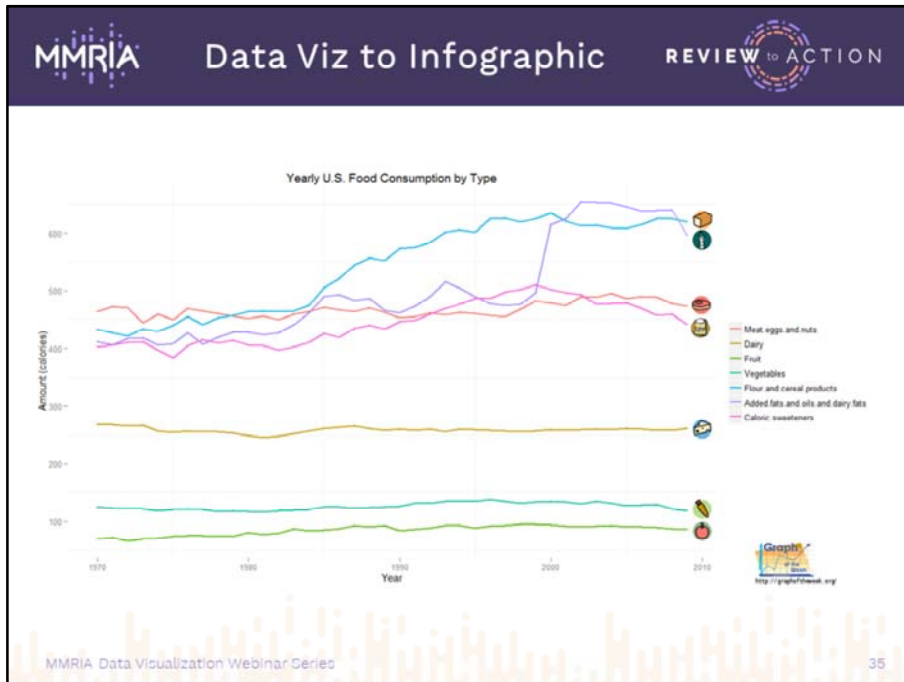
<http://www.graphoftheweek.org/>

MMRIA Data Visualization Webinar Series

34

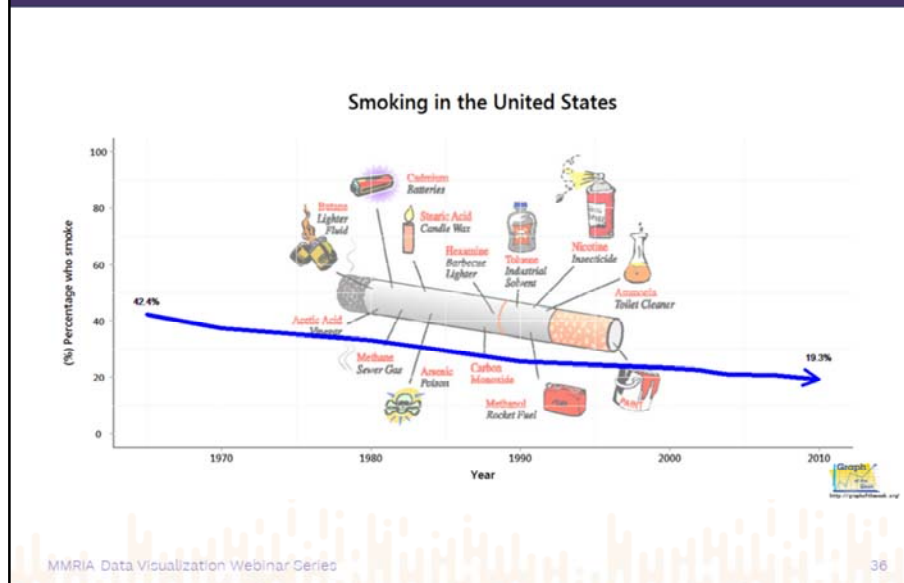
**Level 3;** If your data is more complex and you're thinking of combining it with an image, here's a good reason not to. This was not a well-made line graph to begin with because of the dotted lines, but when they superimposed it onto this image, they really lost what legibility they had. This and many other culprits are called Chart Junk by Edward Tufte.

This one comes from [www.graphoftheweek.org](http://www.graphoftheweek.org), a website that appears to have stopped posting in 2016. It's still an interesting site to visit to see how some charts and graphs work and others really don't.



Here's another example from them. On its own, the line graph is OK.

In this case, the graphics to the right don't get in the way of legibility, but because they're so small and hard to decipher, they're distracting rather than enhancing. It would have been much more clear to simply label each line instead of using the legend on the right. If these icons had to be there at all, keeping their colors relevant to the line they represent and making them larger may have helped.



One more Level 3 from them and I'll move on.

This should have been a simple one-line graph, but there's just too much going on. The harmful contents of cigarette smoke would be a fairly strong graphic on its own, but it isn't clear how or if it's related to the overall decrease in smoking rates, so it ends up muddying the main data point. They don't belong together.

If it's complex, keep it simple.

Use pictographs to illustrate simple terms. For example:

Opioid use disorder during pregnancy has been linked to:

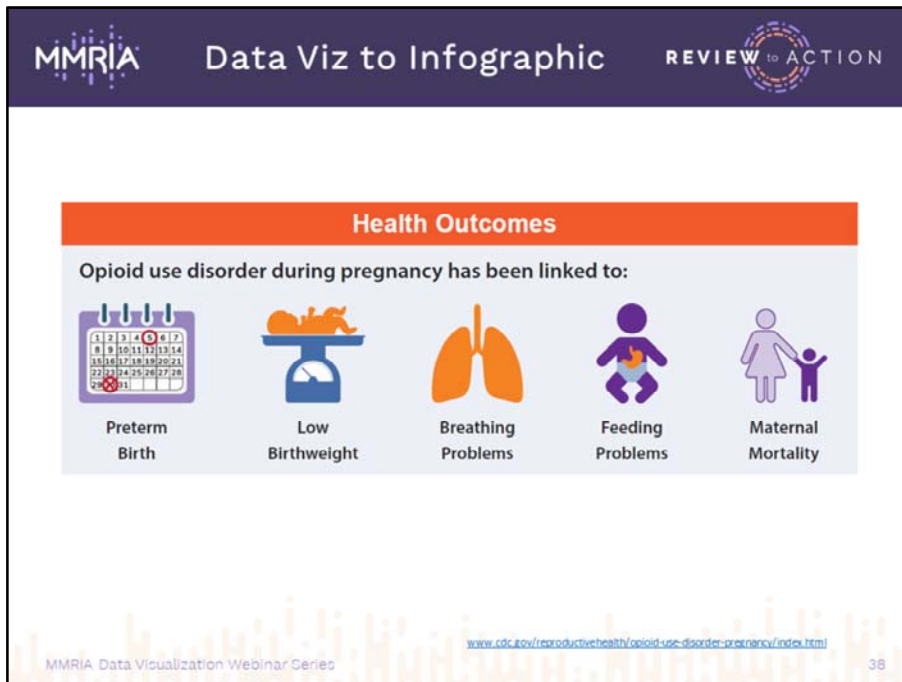
- Preterm birth
- Low birthweight
- Breathing problems
- Feeding problems
- Maternal mortality

Becomes...



Beyond the number of points you're comparing, you can also use images in other ways to convey information. CDC plain language guidelines recommend using bulleted lists instead of long word-comma-word-comma series. Another simple way to perk up content is to use images to break up sections of text.

So... our list here becomes...



This.

Icons are intended to illustrate an abstracted, graphic representation, an IDEA of the issue. They also need to keep detail to a minimum for quicker recognition at a small scale (fine, highly realistic details don't reproduce well.)

Some words or terms can be difficult to work with. Some images will be controversial (here, "Feeding problems" caused debate; it couldn't be either breastfeeding or a bottle. And how do you show "maternal mortality" sensitively?) With some terms, it's just hard to find an image that conveys the meaning clearly, and there will always be differences in interpretation. Each person who views an infographic brings their own experience and opinion to it. Try to keep images as universal and neutral as you can when you build them into infographics.



### Simple works best

- White space is your friend; use it
- Minimize
- Streamline: avoid junk and clutter
- Make it consistent beginning to end

Keep your slides clean and simple.

- Be generous with white space (that area around all the info.)
- Practice an “economy of images”. Not every slide needs a picture; use them when an image provides essential instructions or emphasizes your point more clearly than words alone.
- We constantly borrow information from different sources, cutting and pasting whole slides, blocks of text, or charts and images. You can end up with a different background, color scheme, and font on each slide if you’ve gotten content from many source materials. You can control this to some degree by using the “paste” options in PowerPoint. Otherwise, go back and do damage control throughout so your headers and content use the same font, size, and color, and are in the roughly same place consistently. Check alignment and styles of bullets. Or work from a pre-fab template that builds in your styles and font options.

### Plan your presentation

- Outline your presentation like any other written document
- Sort your slides to match your outline
- Less really is more
- Edit, edit, edit; spell check
- Practice

Your slides should energize and influence people: make sure they make sense.

- Create an outline and abide by it.
- Order your slides so they flow together logically; check for redundancy.
- Start with too much and whittle it down.
- Dot your i's and cross your t's: EDIT EDIT EDIT and make sure everything is spelled correctly.
- Rehearsing helps you sound like you didn't finish writing as you pulled into the parking lot, even **if** that's the case. Read the entire presentation all the way through **at least once** so you aren't surprised by what's there or put the wrong emphasis on the wrong syllable.



Watch your words:

- Limit your text on slides; give details separately
- 5 or 6 bullets per slide
- Be a story teller, not just a reader
- 20-point and up for text

Your slides should be a wide-angle overview instead of a full article. Your audience can't take in all the info you present to them.

- Feature only your most important points. Less text is not a sign that you lack content and it makes slides easier to follow.
- Provide detailed back-up notes or handouts to follow up on your presentation.
- No more than 6 bullets, and 6 can be overkill.
- Narrate your slides from notes that provide your audience with the big story instead of regurgitating every word on every slide.
- One trick for maintaining the right amount of content is to try to keep font sizes within a range of 20-28 points. Most guides say 28 is ideal, but I find that sometimes it looks like I'm shouting. Some audience members will have trouble reading text below 20-pt, especially in large rooms or on older AV equipment.
  - If you have to reduce the point size too much to make all your text fit, STOP: reduce text, not point size!

Animation and transitions are OK, but

- Limit gimmicky motions and sounds
- Don't distract from your message

Powerpoint gives you the option to let things fly in from the left, bounce a few times, twirl, and spin off to the right.

- Limit using tricks and gimmicky effects to entertain your audience. Subtlety is much more effective, and more than likely they're going to be distracted and annoyed by all the bells and whistles if used to excess.
- Speaking of whistles, don't add sound effects either. If you're presenting as part of a skit for a party, OK, but all the special effects can seriously demean your data. Embedded audio and video clips can be used very effectively though.

Use the best graphics you can find:

- Avoid clip art and cartoons
- Look for or take high resolution images (and keep your subject matter in mind)
- Photos of people can get tricky
  - Rights and permissions; copyright
  - Do they represent your data and/or audience appropriately/
- Be careful resizing

You don't have to be a designer to use good graphics.

Like animation and special effects, bad graphics can also diminish your message. PowerPoint has its own clip art library, but, while it might be tempting, most of it falls into the junk category, and over the years everyone's seen it all a hundred times. They're not ALL bad, but if you have access to images from other sources, use them, prudently. If in doubt, just go back to white space.

People like pictures, and they've been proven to draw more attention to text:

- Use high-resolution images; the pictures from your smart phone are usually fine. You can also get pictures from reliable stock sites on the web (there are plenty of freebie sites around if you don't have access to a subscription service). Don't just go out and grab tiny, lo-res images from Google. They'll be grainy and out of focus, and you could run into copyright problems.
- Using photos of people can come with a lot of baggage:
  - There may be restrictions on when and where you can use stock photos of peoples' faces because of associations with some health issues. If you have a subscription, check with the provider.
  - Also check about permissions with pictures you take at events: find out if signed consent forms are required.

- Do the people in your photos adequately or properly represent the subjects in your report or your audience?
- Watch out when you re-size photos: it's easy to distort them. TIP: when resizing images, while you have the picture selected with your mouse, grab a point only at a corner (not on a side, top, or bottom), and hold down the shift key before you start to drag that corner to resize. This keeps the proportions of your image equal so you don't squish or stretch things.

<http://www.garreynolds.com/preso-tips/design/>

Use color, but use it well:

- Use preferred branding if it exists
- Use no more than 2-3 colors
- Cool colors (blue or green) recede; good for backgrounds
- Warm colors appear to advance; good for emphasis
- Don't use color text on color backgrounds (use white on dark colors, black or dark blues on light colors)
- **Avoid hot colors for text**

Color can be an excellent way to add mood or emphasis to your slides.

- Your department probably has a logo and branding guidelines. These may include a preferred color palette or pre-built PPT templates.

If not, keep these points in mind:

- Limit colors to 2 or 3.
- Blues and greens are cooler and less energetic, so they work better as background colors.
- Reds, oranges, and yellows seem to move toward us; these can make urgent info stand out
- Dark backgrounds with light type are better for darker presentation spaces, but not for printing. Lighter backgrounds with dark type are best in brighter rooms and great for printing.
- Don't use "hot" colors for text.

Use the better, safer fonts:

- 2-3 fonts limit
- Avoid specialty fonts like cartoon or script styles
- Sans Serif fonts are easier to read onscreen:

**Serif Font**

**Sans Serif Font**

- Stick with “System Fonts” for better sharing:

**Serif**

- Courier
- Georgia
- Palatino
- Times New Roman

**Sans Serif**

- Arial
- **Impact**
- Lucida Sans
- Tahoma
- Trebuchet
- Verdana

You also don't have to be a designer to use fonts correctly.

- No more than 2-3 fonts per presentation
- Fonts relay a message just as much as the words they spell out. Consider your subject matter and audience: specialty fonts like script styles or cartoony letters are ill-advised for serious topics.
- *Sans Serif fonts*, those without the little feet and tails on the letters, are less strenuous on the eye when your presentation is projected onto a screen, where text can look grainy. *Serif fonts* are easier to read in text-heavy documents like books and journals.
- *System fonts* are those fonts packed with PCs and Macs, and are common to all computers and across the web. Use these to help make sure your presentation will look the way you intended to it in case you share it among audiences.

<http://www.garrreynolds.com/preso-tips/design/>

Exhibit your data appropriately:

- Don't drown your audience in data
- Use the right kind of graph or chart for your data
- Maps are good, but don't get too detailed
- Use tables only for small comparisons

It's easy to flood slides and viewers with too much info.

- Provide the detailed info in your handouts and reference materials or on your website (make sure to include direct links or contact information!)
  - Remember all that chart and graph goodness we've talked about.
  - Maps work, but too much minute detail may be lost or forgotten.
  - Tables can be OK for comparing small bits of data, but they aren't very exciting and can easily be overwhelming when they're heavy-handed on the data points.
- 
- And now back to Nicole for a bit

<http://www.garrreynolds.com/preso-tips/design/>

Create one example of each type of chart/graph:

- Pie chart
- Bar chart
- Line graph



Build a mock-up PowerPoint presentation:

- Outline the story for your infographic
- Include the above charts and graphs
- Total of ~5 slides


Due: September 20<sup>th</sup>

48

NEXT WEBINAR RESCHEDULED FOR OCT 4<sup>TH</sup> AT 3PM



MMRIA Charting Resources REVIEW to ACTION



[Edward Tufte](#)      [Gestalten](#)      [Taschen](#)

[Extreme Presentation](#)      [Chart UX](#)

[Save the Pies for Dessert](#)      [Duke Univ. Chart Dos and Don'ts](#)

[Google Books Ngram Viewer](#)      [CDC Infographic Standards](#)

[Data Visualization 101: How to Choose the Right Chart or Graph for Your Data](#)

MMRIA Data Visualization Webinar Series 49

Many of you may be familiar with Edward Tufte, who's been the reigning arbiter of data visualization for years. He's got 4 books out, and they're all worth a read if you interested in this field.

Data Flow was published by Gestalten Press ten years ago. It's slightly dated on some software recommendations and is mostly centered around BIG data, but it's full of great theory, recommendations, and examples that are still relevant. Apparently it's not in the publisher's catalog anymore, but copies are still available so I've provided a link to it via Amazon

Understanding the World is the most recent in a series of books from Taschen. They're all superb in their inclusion of examples across centuries of practice. And they weigh a ton.

The rest of the links here go to various sites about making charts, graphs, and infographics. Second down on the left is the "Save the Pies for Dessert" article I mentioned earlier



**Contact Us!**

Richard Russell  
rdr5@cdc.gov

Nicole Davis  
dwg4@cdc.gov



Thank you!