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DMPA-SC ACCESS COLLABORATIVE MLE TOOLKIT

Data Visualization Principles

Effective communication for DMPA-SC introduction and scale-up

OVERVIEW

The importance of data from contraceptive self-injection and other self-care approaches

Data has the power to convey the lived experiences of women and adolescents, highlighting the importance and potential of expanding choices to reduce unmet need for contraception. Contraceptive self-injection (SI) data is often missing in routine family planning measurement and evaluation. The Subcutaneous depot medroxyprogesterone acetate (DMPA-SC) Access Collaborative has developed this resource to support family planning programs in tracking progress with SI scale up, thereby advancing a broad contraceptive method mix and quality of care, and influencing policy development and procurement planning across public and private sectors.

The purpose of this tool

This is part of a monitoring, learning, and evaluation (MLE) toolkit of three tools: the data use and indicators guide, data visualization principles, and Excel dashboard: how-to guide for dynamic decision-making tools. The tools are primers in how to create dynamic and visually compelling self-injection program data displays (e.g., dashboards, presentations) that facilitate comprehension and use of SI data for family planning program decision-making. While this tool was developed with DMPA-SC self-injection in mind, many of these principles could be applied to data visualization needs across family planning programs and methods.

Who should use this tool

All three tools are intended for use by individuals who will be presenting SI data to senior family planning program decision-makers. These individuals should have some experience with basic data manipulation (e.g., HMIS focal people) and could be at the central, regional, or district level of the health system or an implementing partner.

Where to find other tools in the toolkit

Please visit the DMPA-SC Resource Library at www.FPoptions.org to access the full MLE toolkit, Toolkit for DMPA-SC monitoring, learning, and evaluation.

About the DMPA-SC Access Collaborative

The PATH-JSI DMPA-SC Access Collaborative provides data-driven technical assistance, coordination, resources, and tools to ensure that have increased access to DMPA-SC self-injection as part of an expanded range of contraceptive methods, delivered through informed choice programming.

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WHY VISUALIZE DATA?

Family planning program managers, ministry officials, implementing partners, and other key stakeholders are often bombarded with information on a daily basis. With the sheer volume, text-heavy, dense materials are ineffective vehicles for decision-makers. Instead, we must rethink how we present our information, which is where data visualization plays a key role. Data visualization packages information into accessible messages that stakeholders are able to better process, retain, and use to make well-informed decisions.
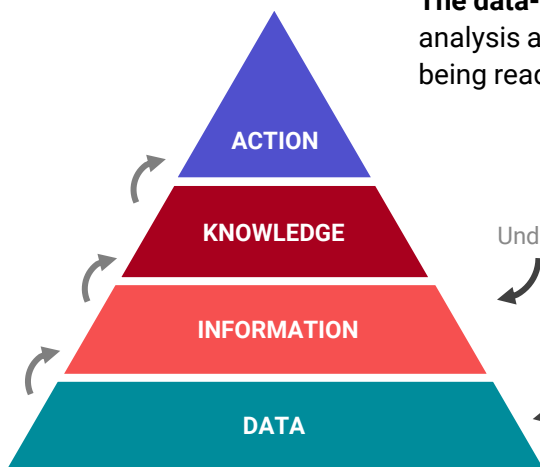
The data-to-action process, as depicted in the pyramid, involves analysis and data visualization to transform data elements from being readable by computers to creating calls to action. As discussed in the Excel guide, data in its rawest form is often easily understood by computers. Tables and graphs transform that data into information, easily understood by humans. Visualization principles, discussed in the following slides, highlight key pieces of that information to create knowledge and spark action.

ACTION

KNOWLEDGE

Understandable by **humans**

INFORMATION

Understandable by **computers**

DATA

In Family Planning program implementation, there are multiple stakeholder groups to consider when transforming data up the pyramid. To ensure the appropriate information is being communicated and acted on, there are three key questions to consider. Your information design should be adapted to each audience.

WHO is your audience?

WHAT do they want to know?

HOW will you communicate it?

Source: Rowley, Jennifer (2007). "The wisdom hierarchy: representations of the DIKW hierarchy". *Journal of Information and Communication Science*. **33** (2): 163–180.

WHY VISUALIZE DATA?

In order to move up the data-to-action pyramid, we must understand how we process information. Research shows that visual information is processed more easily and stays with us longer than text.

Pre-attentive processing is the subconscious accumulation of information from the environment. Examples of pre-attentive attributes are listed below. These attributes help us to process and remember information more quickly and easily.
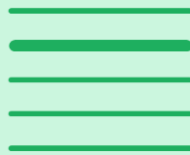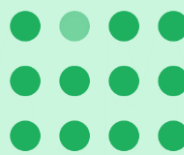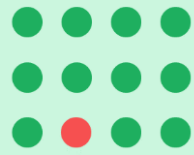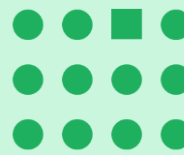
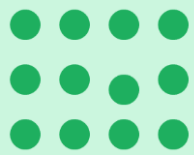| Length	Width	Intensity	Hue

Orientation	Curvature	Shape	Position

Pre-attentive attributes are the building blocks of data visualization.

Source: Van der Heijden, A. H. C. (1996). Perception for selection, selection for action, and action for perception. Visual Cognition, 3(4), 357-361.
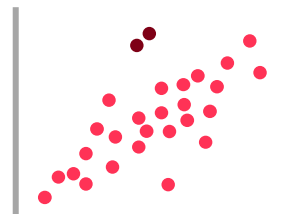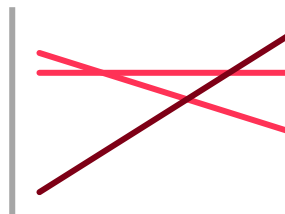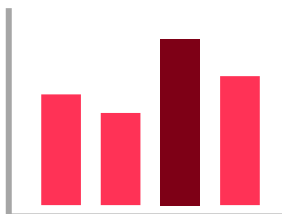
PLANNING FOR DATA VIZ

Data visualizations are any graphic representations of data. Data visualization can communicate huge amounts of data and help identify trends and areas of interest. Visualizing data is important during new service delivery innovations to draw attention to areas for improvement and key successes during program implementation.

Different stakeholders have **different data needs**. Consider your stakeholders' literacy, visual literacy, and what data they need to make decisions.

TYPES OF VISUAL COMMUNICATION

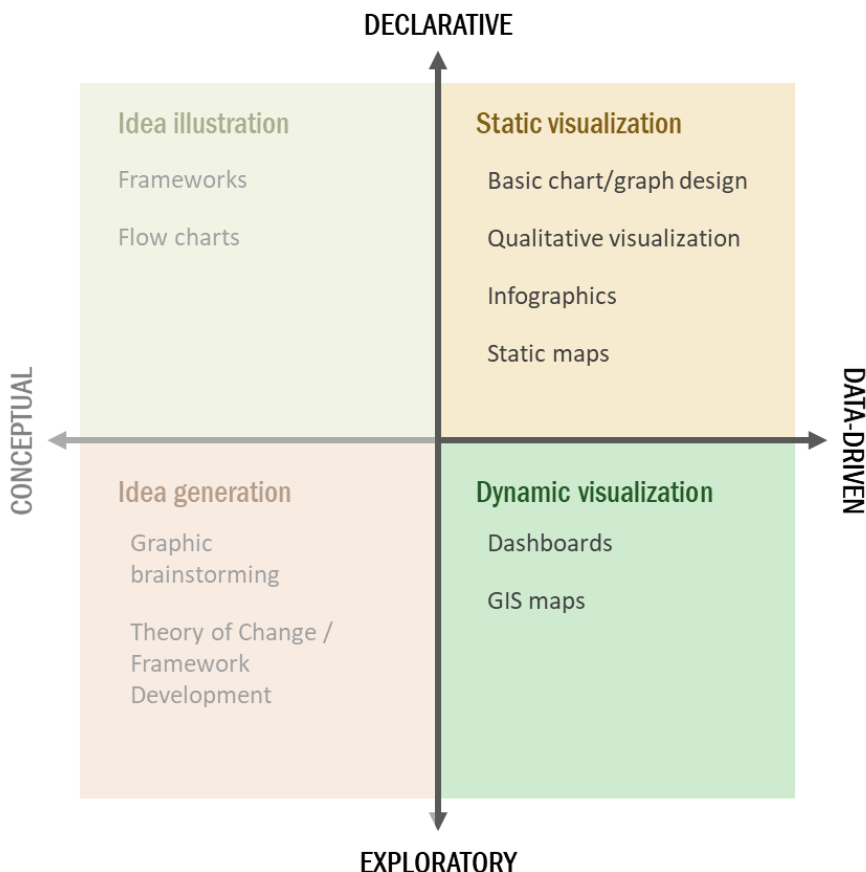The matrix below plots types of visual communication on two axes: The horizontal axis depicts the kind of information you are communicating, ranging from concepts and ideas on the left to hard data on the right. The vertical axis describes the interaction users have with the visual. Declarative visuals tell a clear story, while exploratory communication allows users to interact with the data to reach their own interpretations.

DECLARATIVE

CONCEPTUAL — **DATA-DRIVEN**

Idea illustration
Frameworks
Flow charts

Static visualization
Basic chart/graph design
Qualitative visualization
Infographics
Static maps

Idea generation
Graphic brainstorming
Theory of Change / Framework Development

Dynamic visualization
Dashboards
GIS maps

EXPLORATORY

Often during new service delivery innovation & program implementation, data visualizations fall on the right side of this matrix in the data-driven space. Visualizations for reports (static), presentations, or dashboards (dynamic) are some of the most common examples of these types of data. The left side of the matrix can be relevant during the planning stages before implementation.

DESIGN BASICS

A FEW DESIGN PRINCIPLES

Typeface
Pick appropriate fonts for your audience. Stick to 2-3 at the most and be consistent in usage.

Contrast
Use contrast (light/dark, big/small, thick/thin) to highlight/emphasize.

Color
Use color to emphasize or reinforce value. Avoid the "Skittles effect" of using too many different colors and drowning out the key piece of information

Balance
The eye tends to seek balance and will notice if your design is unbalanced. Use this principle to make your graphic visually pleasing and to highlight/emphasize.

Hierarchy
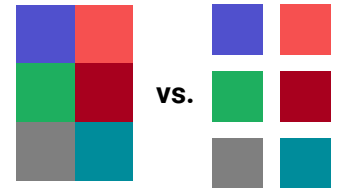Give your audience visual cues of what is the most important part of your message.

CONTRAST

Carefully consider contrast and color for accessibility.

GOOD CONTRAST	BAD CONTRAST
BAD CONTRAST	GOOD CONTRAST

COLOR

Incorporate white space to give the eye a break.

vs.

HIERARCHY & FONT

Use different sizes and types of font to better organize text. This helps users quickly discern the information presented and helps support retaining information.

BEFORE

Facts about Penguins
Penguins are aquatic, flightless birds that are highly adapted to life in the water. Their distinct tuxedo-like appearance is called countershading, a form of camouflage that helps keep them safe in the water. Penguins do have wing-bones, though they are flipper-like and extremely suited to swimming. Penguins are found almost exclusively in the southern hemisphere, where they catch their food underwater and raise their young on land.
Diet Staples: Krill, fish and squid. In general, penguins closer to the equator eat more fish and penguins closer to Antarctica eat more squid and krill.
Population: The penguin species with the highest population is the Macaroni penguin with 11,654,000 pairs. The species with the lowest population is the endangered Galapagos penguin with between 6,000-15,000 individuals.
Location: Penguins can be found on every continent in the Southern Hemisphere from the tropical Galapagos Islands (the Galapagos penguin) located near South America to Antarctica (the emperor penguin).

AFTER

FACTS ABOUT PENGUINS
Penguins are aquatic, flightless birds that are highly adapted to life in the water. Their distinct tuxedo-like appearance is called countershading, a form of camouflage that helps keep them safe in the water. Penguins do have wing-bones, though they are flipper-like and extremely suited to swimming. Penguins are found almost exclusively in the southern hemisphere, where they catch their food underwater and raise their young on land.

DIET
Krill, fish and squid. In general, penguins closer to the equator eat more fish and penguins closer to Antarctica eat more squid and krill.

POPULATION
The penguin species with the highest population is the Macaroni penguin with 11,654,000 pairs. The species with the lowest population is the endangered Galapagos penguin with between 6,000-15,000 individuals.
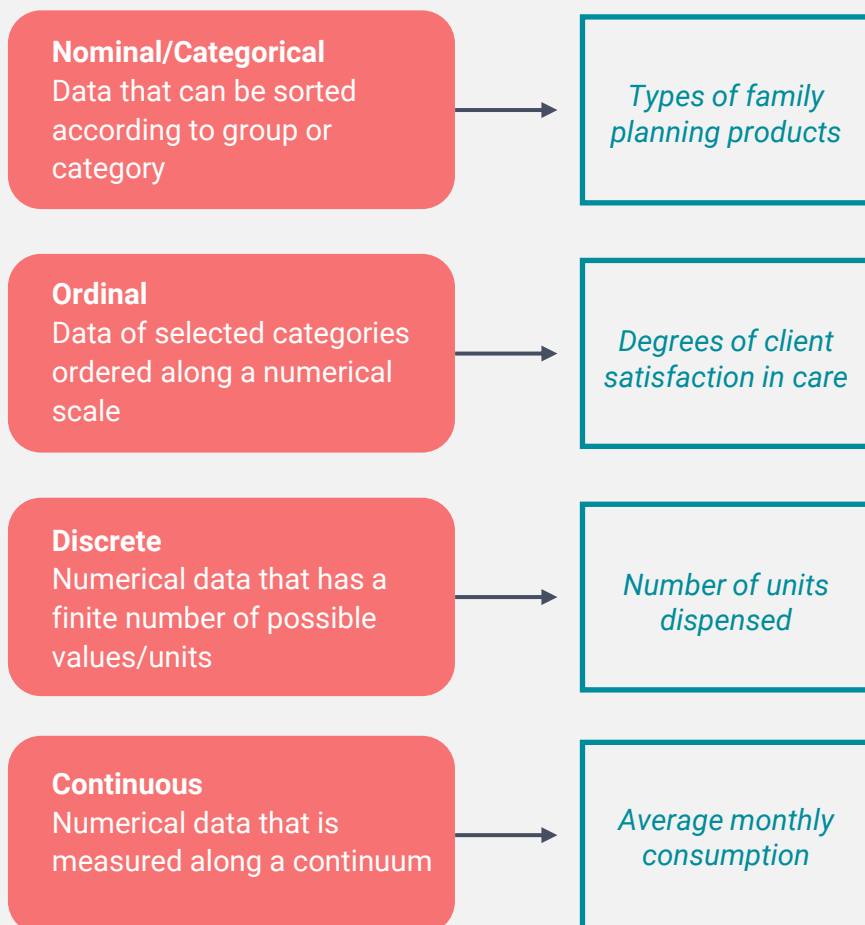
LOCATION
Penguins can be found on every continent in the Southern Hemisphere from the tropical Galapagos Islands (the Galapagos penguin) located near South America to Antarctica (the emperor penguin).

SELECTING THE RIGHT CHART TYPE

When designing effective data visualizations it is important to understand your data and select the appropriate chart to communicate your message. The first step is to define your data types then use the decision tree on the next page to see which visual best fits your data types.

QUANTITATIVE DATA TYPES

Nominal/Categorical
Data that can be sorted according to group or category
→ *Types of family planning products*

Ordinal
Data of selected categories ordered along a numerical scale
→ *Degrees of client satisfaction in care*

Discrete
Numerical data that has a finite number of possible values/units
→ *Number of units dispensed*

Continuous
Numerical data that is measured along a continuum
→ *Average monthly consumption*
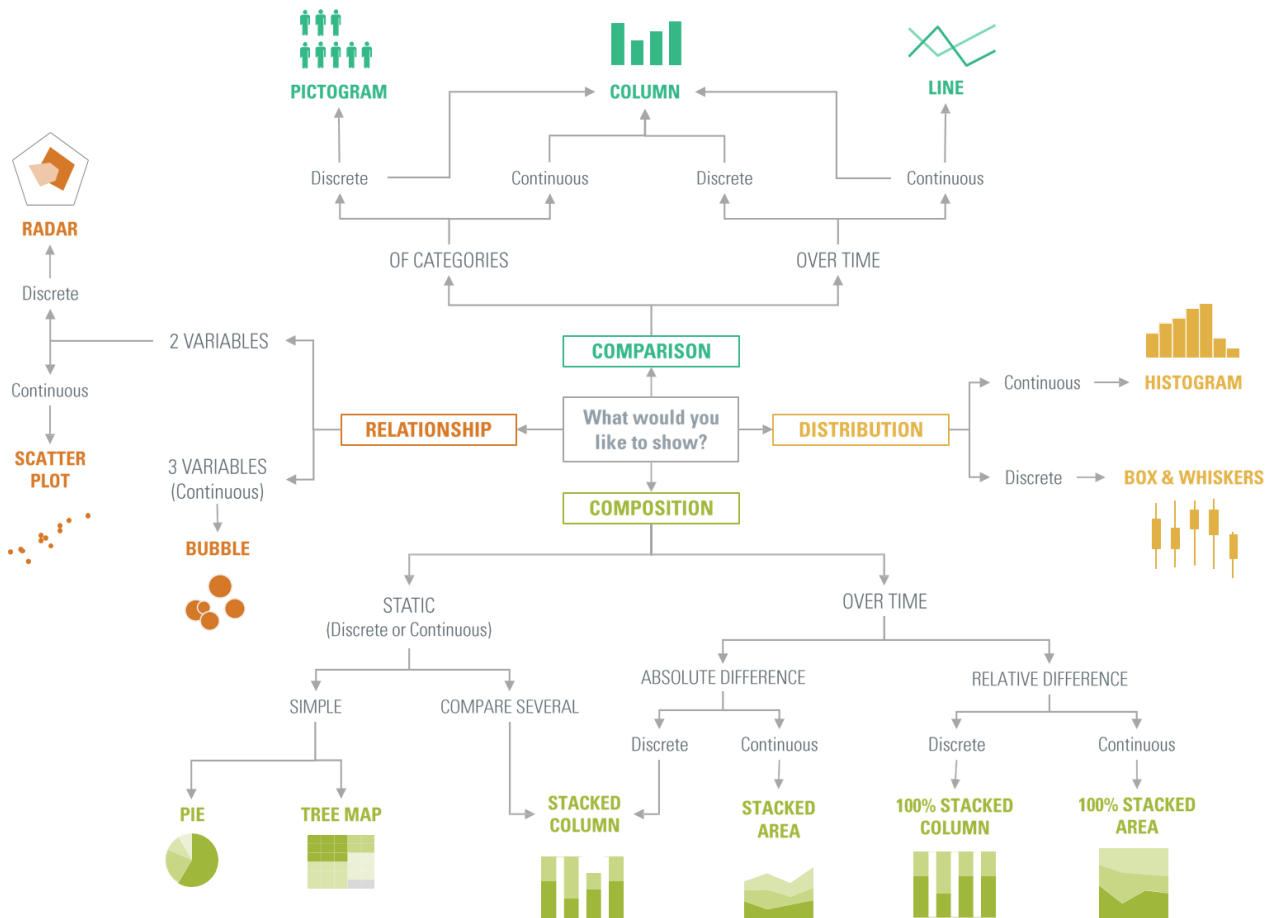
SELECTING THE RIGHT CHART TYPE

QUANTITATIVE CHART CHOOSER

COMPOSITION
Shows the makeup of one or more variables usually in absolute numbers and in normalized forms

DISTRIBUTION
Visualization methods that display frequency, how data spread out over an interval or is grouped.

RELATIONSHIP
Visualization methods that show relationships and connections between the data or show correlations between two or more variables

COMPARISON
Visualization methods that help show the differences or similarities between values.
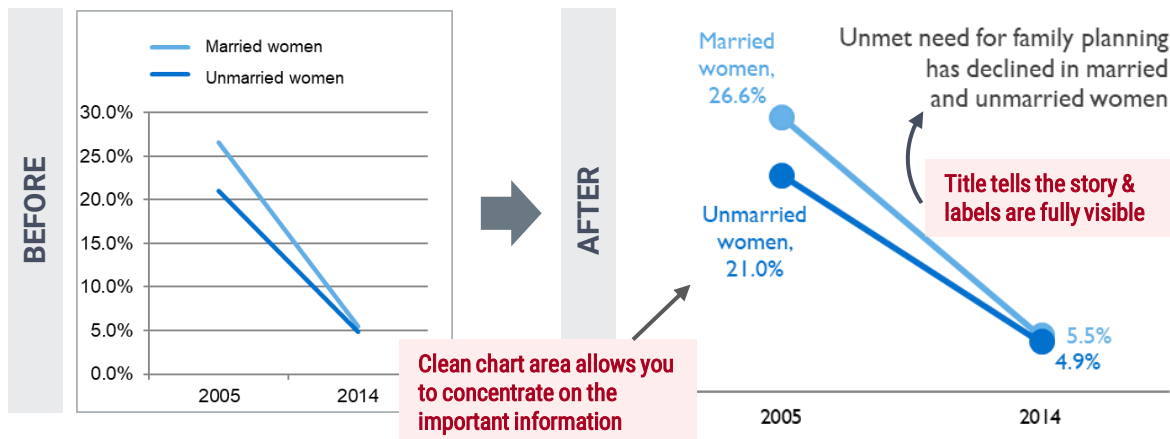
COMMUNICATING CLEARLY WITH CHARTS

In addition to selecting the right chart type, there are a few additional key steps to clearly communicate your message. These techniques help users interpret and more easily understand key messages about the data and information that you are presenting.
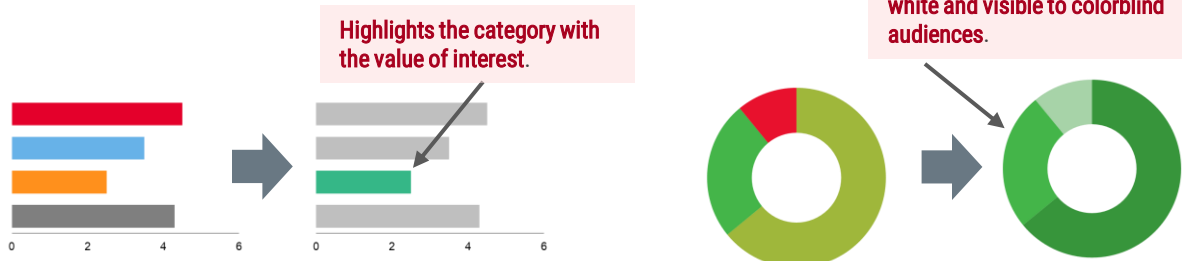
DECLUTTER YOUR CHART

Remove default lines, borders, and tick marks that distract your audience. Only essential chart components remain in the 'after' chart.

CREATE PURPOSEFUL TITLES & LABELS

Be clear and succinct in telling the reader the key takeaway with your titles. Consider using data labels sparingly, reserving them for key data points.

BEFORE

Married women
Unmarried women

30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
2005   2014

AFTER

Married women, 26.6%

Unmarried women, 21.0%

Unmet need for family planning has declined in married and unmarried women

Title tells the story & labels are fully visible

5.5%
4.9%

2005   2014

Clean chart area allows you to concentrate on the important information

## USE COLOR TO ADD IMPACT & ACCESSIBILTY

Using color sparingly makes it more powerful and helps the important points stand out. Consider black and white printing and accessibility when choosing colors.

Highlights the category with the value of interest.

Will print clearly in black & white and visible to colorblind audiences.

BEST PRACTICES

Avoid 3D charts. Use a "flat" design instead. In 3D charts, it is difficult to discern where the top of the data ends because the columns become obscured. When comparing charts, use the same chart style.

BEFORE

AFTER

BEFORE

AFTER
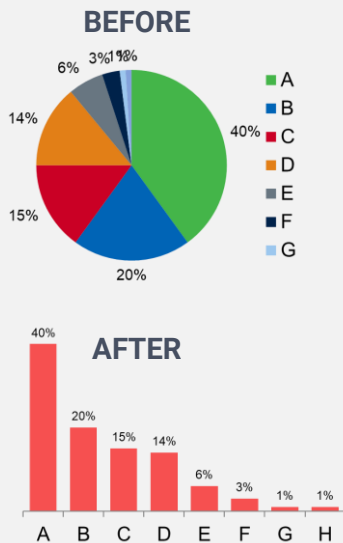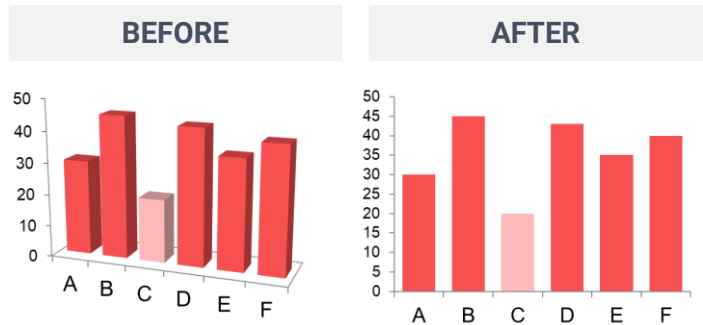
Avoid using pie charts if possible, especially for comparisons. While the pie chart is one of the most popular chart types, visually, information is not easily digested. Viewers are only able to gauge the size of slices if they are familiar with percentages (25%, 50%, 75%, 100%) and positions (common angles). We interpret other angles inconsistently, making it difficult to compare relative sizes and therefore, less effective as a visual representation of data. Even with data labels, the user needs to work to understand the data relationships. If using pie charts, sort the categories in descending order and use less than five categories.

Use the full axis starting at zero. Starting a graph at zero avoids any chance of your graph being misleading with its data and misunderstood by your audience. For example, a bar graph beginning above zero risks exaggerating the differences between the data being compared.
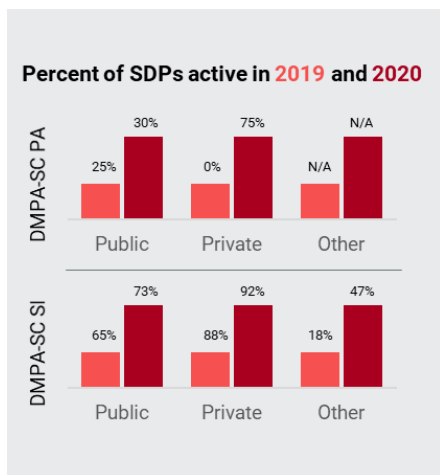

BEFORE
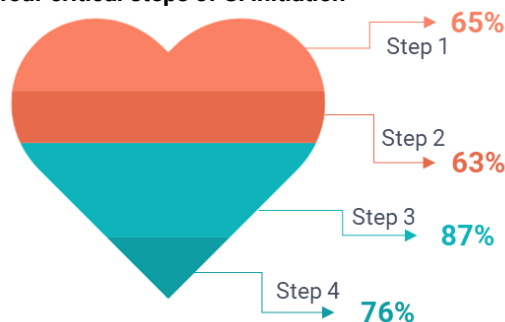
AFTER

PITFALLS TO AVOID

The examples presented on this page need improvements and include practices that should be avoided.

NUMBERS THAT MAKE SENSE

Parts of a whole should not add up to more than 100% like the graphic on the right. It is also important to use appropriate shapes to tell your story. A pictogram may be more appropriate.

Percent of providers performing the four critical steps of SI initiation

- Step 1 — **65%**
- Step 2 — **63%**
- Step 3 — **87%**
- Step 4 — **76%**

Percent of SDPs active in 2019 and 2020

DMPA-SC PA
- Public: 25%, 30%
- Private: 0%, 75%
- Other: N/A, N/A

DMPA-SC SI
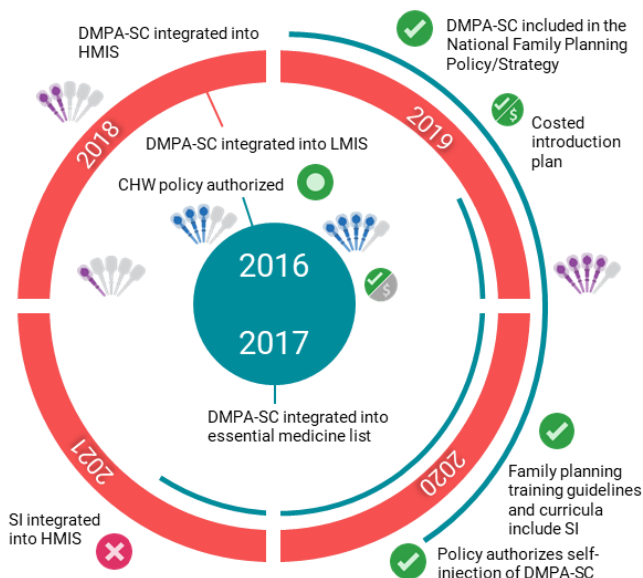- Public: 65%, 73%
- Private: 88%, 92%
- Other: 18%, 47%

ACCURATE SCALES

Make sure your graphs correlate with your data. The graph images on the left are the same between sectors and mode of administration, yet the data range from 0% to N/A to 92%. When comparing shapes, adjust size appropriately. For example, when comparing circles, increase the circle size by area instead of diameter.

APPROPRIATE DESIGN FOR USERS

Don't make the user work by overwhelming the visualization. The timeline figure on the right is overly complicated and not intuitive, as the dates do not follow a linear timeline. Plotting fewer points and in a different shape would help make the timeline more clear.

Changing the axis placement or order to go against norms (e.g., axis going from 100-0 instead of 0-100), misconstrue your data and is not recommended.

- DMPA-SC integrated into HMIS
- DMPA-SC integrated into LMIS
- CHW policy authorized
- 2016
- 2017
- DMPA-SC integrated into essential medicine list
- SI integrated into HMIS
- 2018
- 2019
- 2021
- 2020
- DMPA-SC included in the National Family Planning Policy/Strategy
- Costed introduction plan
- Family planning training guidelines and curricula include SI
- Policy authorizes self-injection of DMPA-SC

ADDITIONAL RESOURCES

If you want to...	Check out...
Be inspired by great data visualizations	Information is Beautiful	informationisbeautiful.net Flowing Data	flowingdata.com
Improve your presentation design	Web: AEA Potent Presentations Initiative	p2i.eval.org Rad Presenters Podcast	radpresenters.com Lea Pica	leapica.com Books: Slideology	Nancy Duarte Resonate	Nancy Duarte
Learn from chart redesigns	PolicyViz	policyviz.com/remakes Storytelling with Data	storytellingwithdata.com/gallery
Figure out what chart type to use	Data Visualization Catalogue https://datavizcatalogue.com/index.html Graphic Continuum blog.visual.ly/graphic-continuum
Build a better chart in Excel	Decluttered Excel Templates from Storytelling with Data Excel Tutorials from Ann Emery
Build a better chart using an online tool	Visage	visage.com Piktochart	piktochart.com

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