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Visualizations for Effective Program Performance Tracking: How to Choose the Right Visuals to Achieve Targets

March 9, 2023

Andres Montaner

M&E – Right To Care

ASAP II
ACCELERATING SUPPORT TO ADVANCED LOCAL PARTNERS II

PEPFAR

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Rapidly prepare Local Partners to have the capabilities and resources to serve as Prime Partners for USAID/PEPFAR programming, in compliance with USAID and PEPFAR procedures, for PEPFAR program implementation in FY 2022 and 2023.

70% of USAID PEPFAR funding to local prime partners.

STRATEGIC OBJECTIVES

1. Strengthen Local Partners as they transition to receive PEPFAR funding as a USAID Prime Partner to comply with regulations.
2. Prepare Local Partners to directly manage, implement, and monitor PEPFAR programs, and maintain consistent PEPFAR program achievement and quality.

ASAP II

ACCELERATING SUPPORT TO ADVANCED LOCAL PARTNERS II

CURRENT **ASAP II-SUPPORTED COUNTRIES**

Angola

Cameroon

Côte d’Ivoire

DRC

eSwatini

Ethiopia

Lesotho

Malawi

Namibia

Nigeria

South Sudan

Uganda

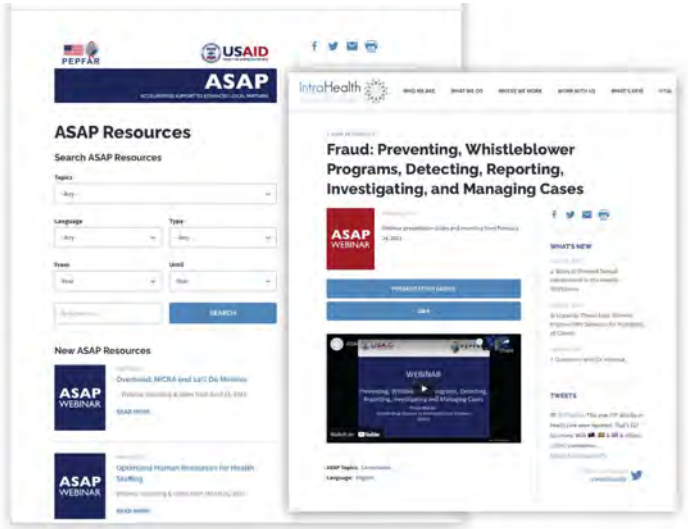
Zimbabwe

KEY RESULTS from ASAP I & II

ASAP has supported **112 local organizations** in **18 countries**

101 local partner organizations

11 local government partners



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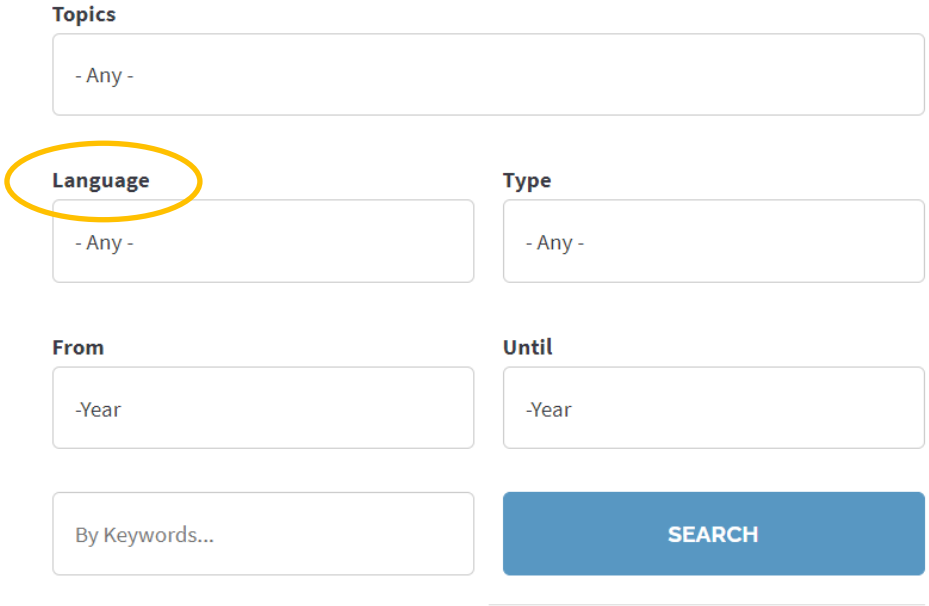
Choose your **language or topic.**

Featuring webinars in **French, English, and Portuguese.**



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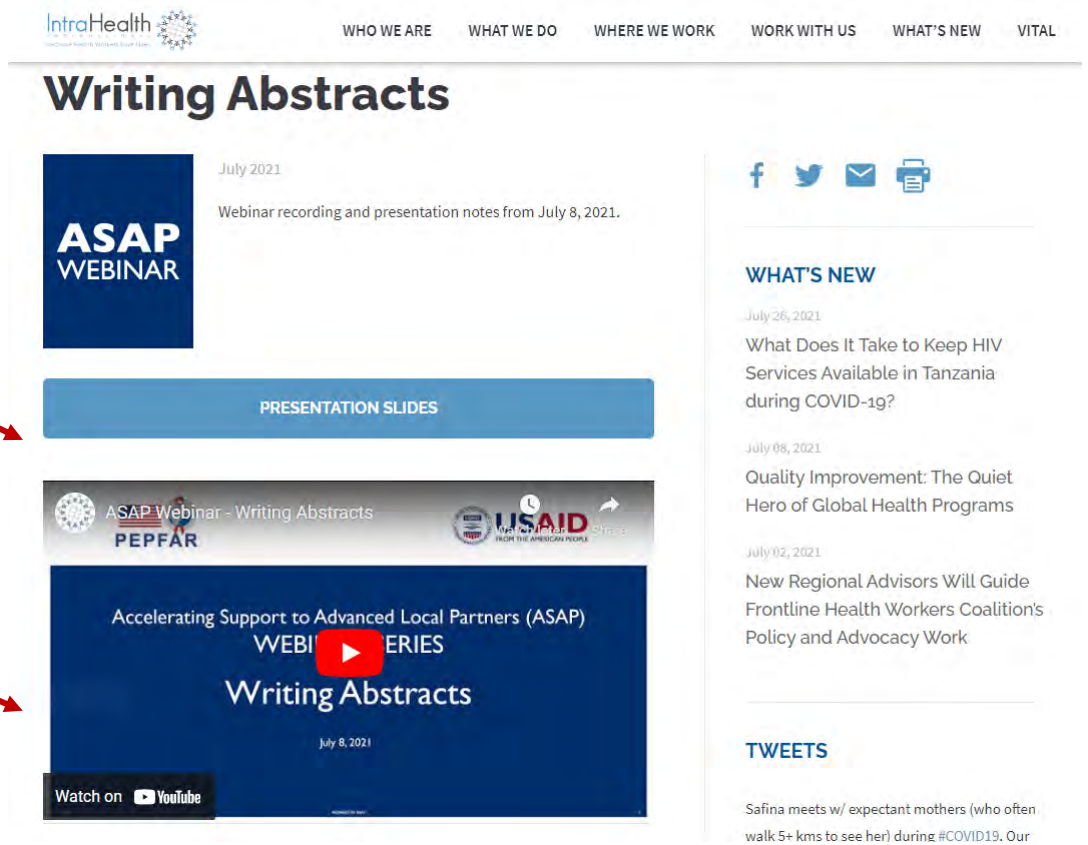


UPCOMING ASAP II WEBINARS

Path to Prime Webinar Series

English-language

Visualizations for Effective Program Performance Tracking – Mar 9

Data Processing Overview & a Demonstration in PowerBi – Mar 23

Advanced Analytics for Data Driven Decision Making & Action – Apr 13

Practical Application GIS Methods & Tools to Guide Spatial Targeting & Micro-Planning – Apr 20

Portuguese-language

Desenvolver Conselhos de Administração Extremamente Eficazes – Mar 30

https://www.intrahealth.org/upcoming-asap-webinars

TODAY'S PRESENTER

Andres Montaner

Senior Monitoring & Evaluation Manager

Right to Care, a South Africa-based USAID Local Partner and ASAP II Consortium Partner

Q&A Support

Aart De Zeeuw

Subject Matter Expert on Results Based Management

Part 1: Data Demand and User Requirements Specifications

Data Demand and Use Defined

- **Data Demand** – **What kind of information is needed** to inform program action:
  - Decision makers define what data is required of a program
- **Data Use** – **How data is reviewed and applied** for program action:
  - Reporting for funder, government, or internal to organization
  - Monitoring the project
  - Allocating resources
  - Creating or revising an intervention
- New data demands can lead to development of new data processing systems and visualizations

The Role of a Data Processing System

- What is a Data Processing System?
  - People vs. computers
  - Policy
  - Technical
  - Examples: Monthly, annual, and Excel-based reports; DATIM; DHIS2

- How to create a Data Processing System:
  - Define a procedure with inputs and outputs based on data demand and required data use

User Requirement Specifications (URS) Document

- The URS describes what is required from the new Data Processing System:
  - Report generation, dashboards, data extracts, visuals…
- User specifications are written:
  - Before the new system is created
  - By the system owner, with input from users

- Process of developing a data system

- Benefits of URS

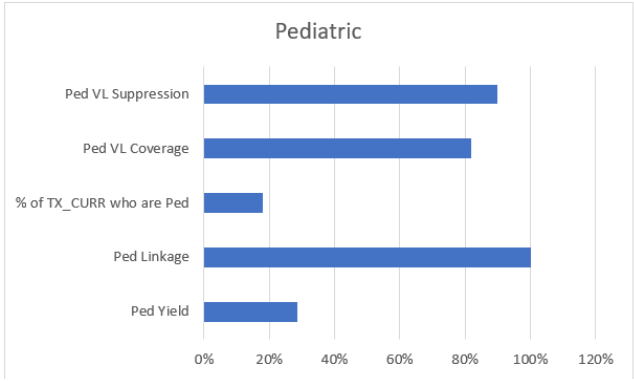
User Requirements Specifications (URS) Gathering and Documenting

- What is required of the Data Processing System?
  - Input - data source (submission, database)
  - Output- dashboard, visuals, extract, integrated online system…

- Building on the current program structure
  - Data dictionary
  - Software compatibility

- Clarity and detailed documentation at the foundation of building are critical

Report No.	7.31	Report Name	Pediatric Example	Report Type	Bar Graph
Publishing Platform	Dynamic	Order	Dynamic	Data Source	Weekly Template



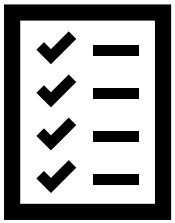
Parameters	Required/ Optional	Format	Multi/ Single	Dependency	Sort
Province	Required	Text	Multiple	When selected only Districts Hubs for that Province should show	Asc
District Hub	Option	Text	Multiple	When selected only Districts for that District Hub should show	Asc
District	Optional	Text	Multiple	When selected only facilities for that District should show	Asc
Facility	Optional	Text	Multiple	Controlled by the selected above filters	Asc
Facility Type	Optional	Text	Single	NONE	Asc
Gender	Optional	Text	Multiple	NONE	Asc
From Date	Required	Date (Date Picker)	Single	NONE	NONE
To Date	Required	Date (Date Picker)	Single	NONE	NONE

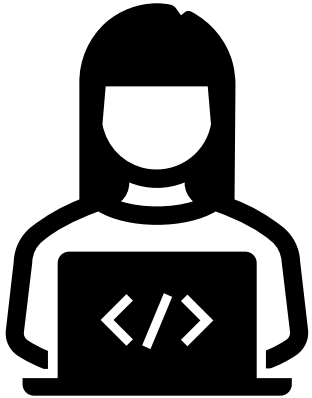
	VALUES	CALCULATION	DATA SOURCE	FORMAT
Values & Calculation				
	TX_CURR (pediatric)	Only for age group 0-14	Weekly Template	Number
	Ped Yield	HTS_POS / HTS_TST (Only for age group 0-14)	Weekly Template	Percentag
	Ped Linkage	TX_NEW / HTS_POS (Only for age group 0-14)	Weekly Template	Percentag
	% of TX_CURR who are Ped	TX_CURR Only for age group 0-14 / TX_CURR All age groups	Weekly Template	Percentag
	Ped VL Coverage	PVLS(D) / VL Eligible (Only for age group 0-14)	Weekly Template	Percentag
	Ped VL Suppression	PVLS(N) / PVLS(D) (Only for age group 0-14)	Weekly Template	Percentag
			Weekly Template	Percentag

Note:

- **The default daily report will display only priority facilities at a regional level**

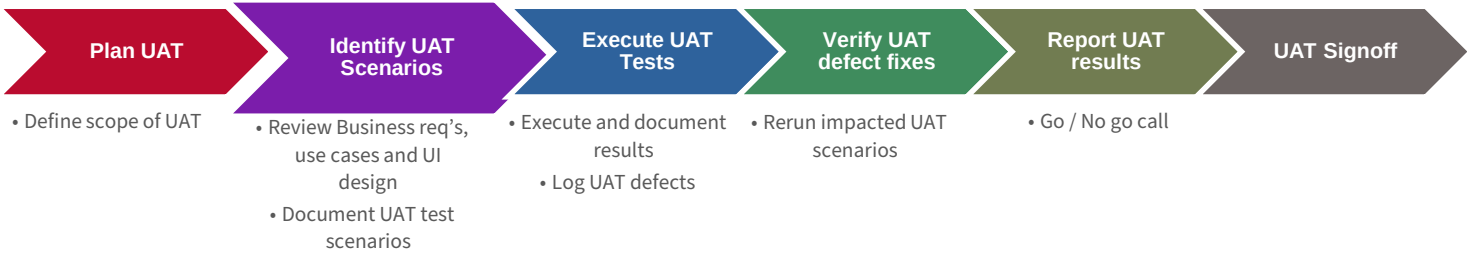
Deployment is based on User Requirement Specifications





User Acceptance Testing (UAT)

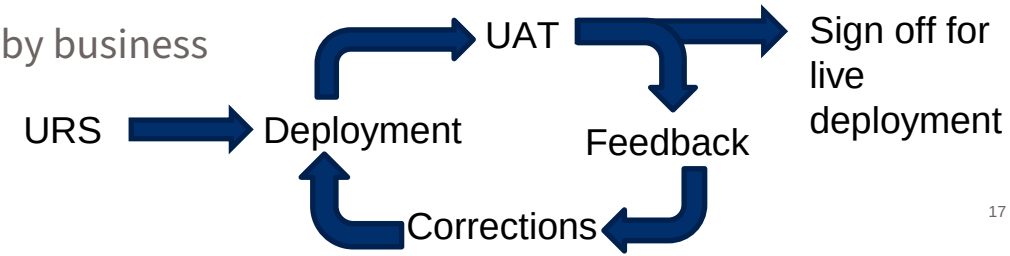
- WHAT? A process of verifying data product against user requirement specifications (URS)
- WHY? To assess if the data product will support program operations as required
- HOW? Product testing/review against the URS and documenting feedback



- WHO? UAT Team (staff knowledgeable about URS and relevant data demand and use)

UAT Cycle

- If a UAT has not passed, feedback will be sent for correction and redeployment for another UAT
- Finally, UAT passes and is signed off by business
  - Product deployed for live use



Poll 1

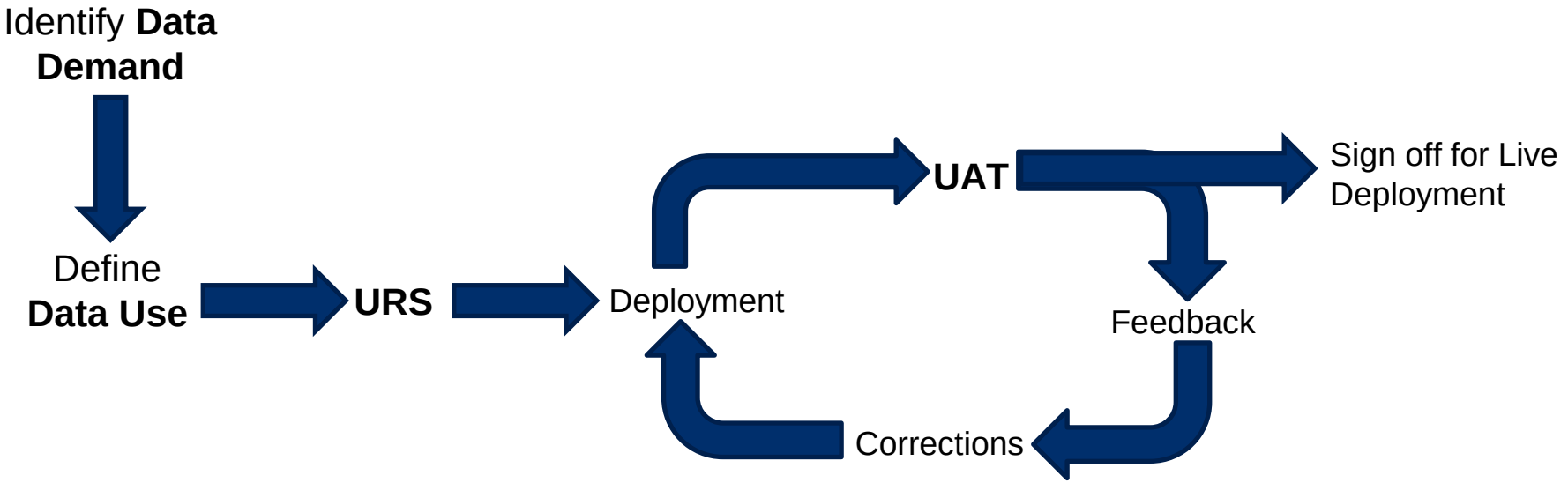
1. What is the outlined process for new system development?

a. UAT > URS > Final Deployment
b. URS > UAT > Final Deployment
c. URS > Final Deployment > UAT
d. UAT > Final Deployment > URS

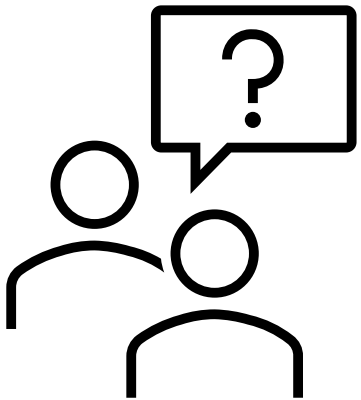
2. Is it possible to fail UAT after a deployment based on a URS?

a. Yes
b. No

Questions on the process of URS to deployment?



Questions?



Part 2: Selecting the Correct Data Visualization to Match Data Demand

Why Data Visualization?

All projects generate performance data. But not everyone knows how to ***read*** or ***use*** it.

When data is presented in a ***solely textual manner*** (Excel, CSVs), it can be ***difficult to interpret*** and ***not see the patterns*** that live within the data.

This is where the ***data visualization*** comes to the rescue. Let's look at an example before going into some of the most widely used graphs.

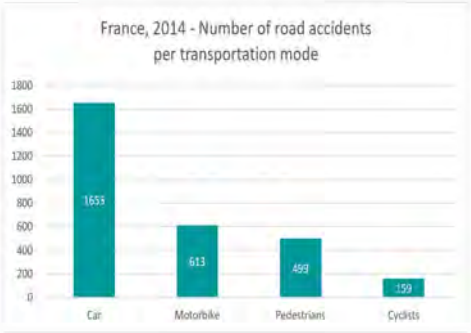
EXAMPLE OF DIFFERENT WAYS TO VISUALIZE THE SAME DATA

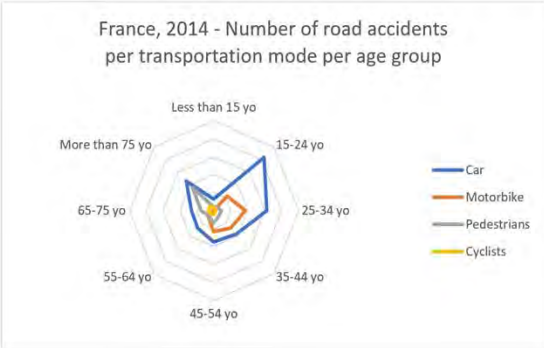
The table (1) below gives an easy and quick overview of the exact number of road accidents incurred by pedestrians between 45 and 54 years old.

But how does this compare to cyclists or motor bikers? Simple column/bar graphs can highlight the proportions. Column graph (2) clearly shows that car accidents are more numerous than accidents of other transportation modes.

But a graph can do much more! This radar chart (3) highlights risk profiles: 15-24 and 25-34 years old are clearly at risk for car accidents; 25-34 years old for motorbiking accidents, and more than 75 years old for pedestrians

France, 2014 - Number of road accidents per transportation mode	Car	Motorbike	Pedestrians	Cyclists	Total
Less than 15 yo	63	1	20	16	**100**
15-24 yo	419	114	28	11	**572**
25-34 yo	313	187	44	10	**554**
35-44 yo	186	139	43	12	**379**
45-54 yo	173	117	71	19	**380**
55-64 yo	136	48	41	22	**247**
65-75 yo	133	6	74	34	**247**
More than 75 yo	230	1	179	35	**445**
Total	**1653**	**613**	**499**	**159**	**2924**





TABLES: THE MOST ELEMENTARY WAY TO PRESENT DATA

Attitudes and Behaviours of Healthcare Professionals toward HIV Patients

Stigma and Discrimination	Health Care Professionals (HCPs)									
	Doctor N=50		Nurse N=50		Scientists N=50		Orderlies N=50		Pharmacists N=50	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Attitudes of HCP to PLWHIV										
HIV is a serious threat to health workers	44	06	48	02	46	04	50	-	47	03
Treating PLWA increased risk of contracting HIV	45	05	48	02	47	03	50	-	49	01
HIV patients poses a great danger to HCPs	42	08	45	05	40	10	50	-	44	06
HIV/AIDS patients deserve to die	-	50	02	48	-	50	04	46	03	47
HIV patients should not be given best treatment	-	50	-	50	-	50	-	50	-	50
HCPs should retain their friendship with PLWAs	50	-	50	-	50	-	48	02	50	-
HCPs should not share office with HIV patients	-	50	01	49	-	50	04	46	02	48
HCPs should visit HIV patients	50	-	50	-	50	-	48	02	50	-
HCPs should allow relation to marry HIV patients	20	30	15	35	12	38	05	45	10	40
Attitude of Health Workers towards Treatment of HIV/AIDS Patients										
I want to be removed from caring for PLWHIV	05	45	07	43	03	47	08	42	06	44
HIV testing for patients without consent	04	46	10	40	05	45	12	38	07	43
HCPs with HIV should be disengaged	-	50	-	50	-	50	-	50	-	50
Refusing to hug/touch HIV patient	04	46	10	40	05	45	08	42	-	44
Refusal of admission to a hospital	-	50	-	50	-	50	-	50	-	50
Refusal to operate/assist in clinical procedures	-	50	-	50	-	50	-	50	-	50
Cessation of ongoing treatment	04	46	10	40	05	45	10	38	07	43
Early discharge from hospital	07	43	04	46	01	49	11	39	05	45
Bad facial expression when treating HIV patient	01	49	04	46		50	10	47	06	44
Judgemental attitudes	03	47	06	44	04	46	09	41	05	45
Physical isolation in the ward	02	48	05	45	01	49	11	39	06	44
Restrictions of movement around the ward		50	-	50	-	50	-	50	-	50
Restricted access to shared facilities	04	46	10	40	05	45	10	38	07	43
Double-gloving when taking pulse/ giving patients medication of HIV patient	03	47	10	38	06	44	15	35	10	40

Source: “Attitudes and Behaviors of Healthcare Professionals toward HIV Positive Patients in a Tertiary Hospital”, (Federal Teaching Hospital, Ido-Ekiti, Nigeria); Esan A Jacob, Osime E. O, F Kolawole and Oyedele E Titilayo. (2022)

Main Questions to Ask for Choosing the Right Visualization

1) Who will be the **audience** for the project data?
2) What **insights** behind the data do the users want the graphs to highlight?
3) What is the **most impactful way** to show the project's achievements or challenges to date?

- Determine which one or more of the **four main properties** of data presentation fit these requirements:
  - How data is composed (**Composition**)
  - How variables relate to each other (**Relationship**)
  - How a variable behaves in comparison to others (**Comparison**)
  - How data is distributed across dimensions (**Distribution**)
- To choose the **right visualizations** to show/report a project's performance against MER indicator targets, a "visualization decision tree" can be a very helpful tool.

Chart Visualization Decision Tree: the Four Main Properties

Property 1: Comparison

Comparisons are used to evaluate the magnitude of values to each other and to easily identify the lowest or highest values in the data. If you want to compare values over time, line or bar charts are often the best option; which you choose depends on the number of periods you would like to analyze. However, bar or column charts are better for comparisons among items. Line charts provide a sense of continuity that might not be meaningful for categories.

Property 2: Composition

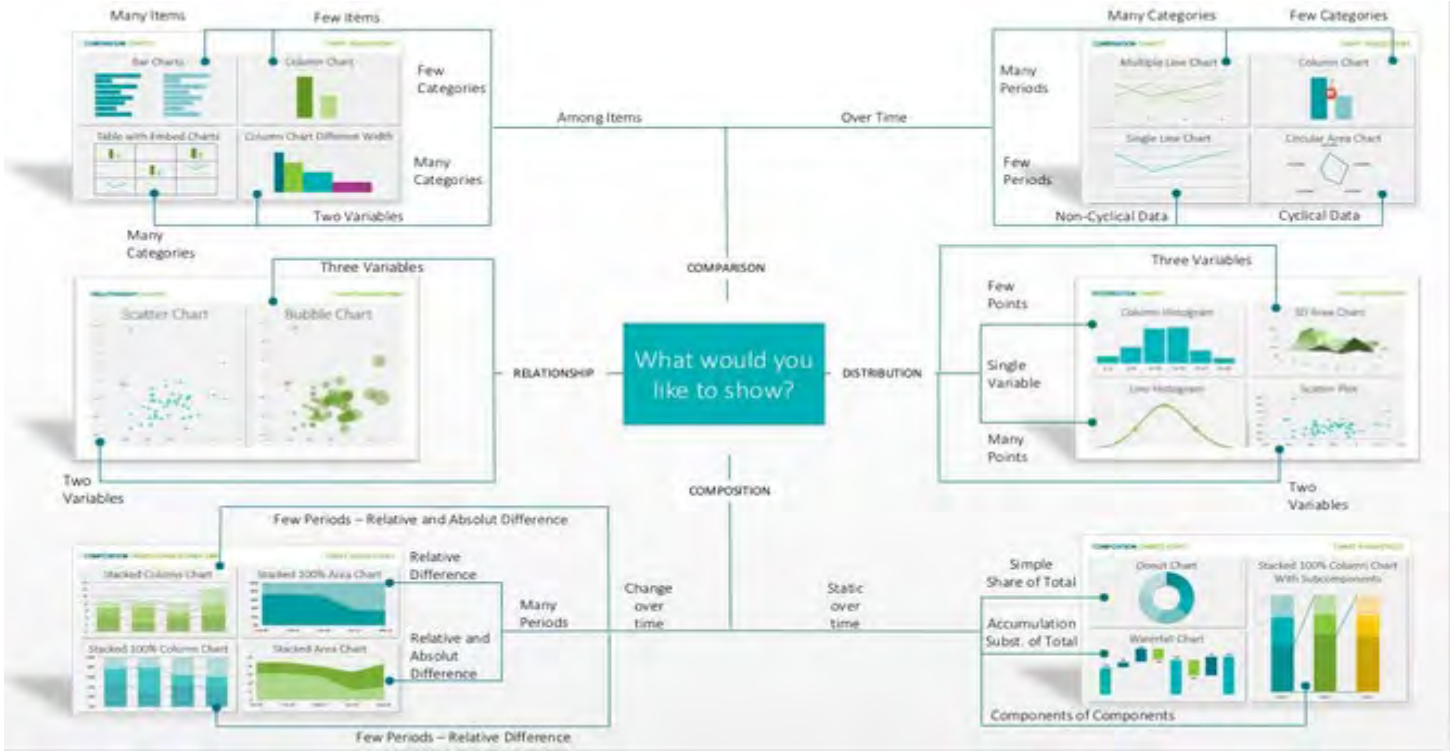
Composition charts are used to see how a part of your data compares to the whole, and can show relative and absolute values. They can accurately represent both static and time-series data. For static data, a pie chart can do the job. However, there also other options that can tell the same story, such as a stacked bar chart, a waterfall chart, or a tree map. For time-based data, the number of periods is again a decisive factor in choosing your chart. You can visualize composition over many periods with area charts, which are very similar to line charts and stacked bar or column charts when you have a reduced amount of periods.

Chart Visualization Decision Tree: the Four Main Properties (cont'd)

Property 3: Distribution
When studying how quantitative values are located along a range, distribution charts are the way to go. By looking at the shape of the data, the user can identify features such as value range, central tendency, and outliers.

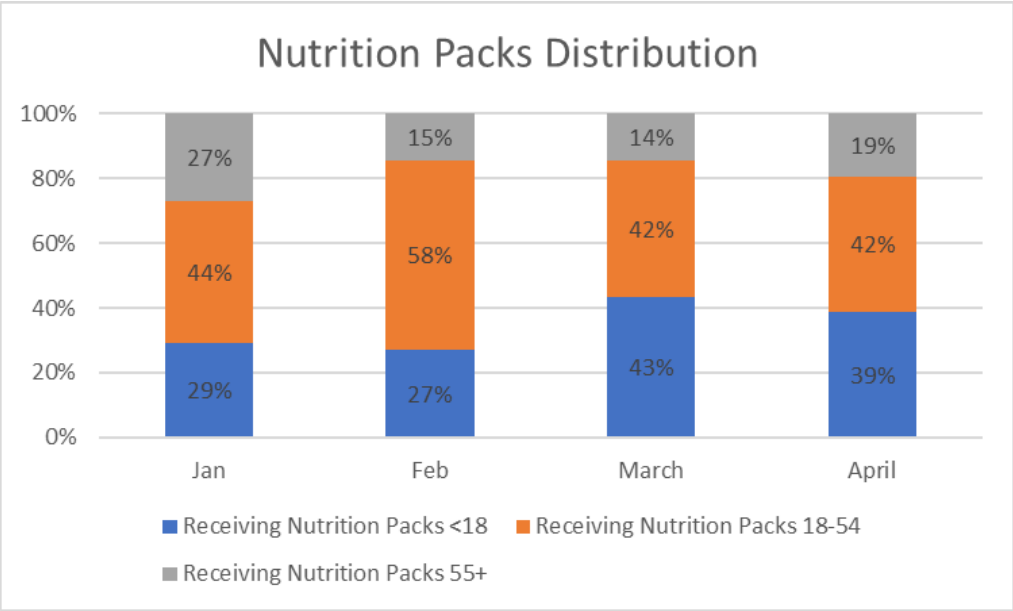
Property 4: Relationship
Relationship charts are used to find correlations, outliers, and clusters in your data. While the human eye can only appreciate three dimensions together, you can visualize additional variables by mapping them to the size, color, or shape of your data points. They have a constrained set of options, as scatter plots are usually the adequate way of presenting the data.

Chart Visualization Decision Tree



Source: Andrew V. Abela, ExtremePresentation.com, 2009

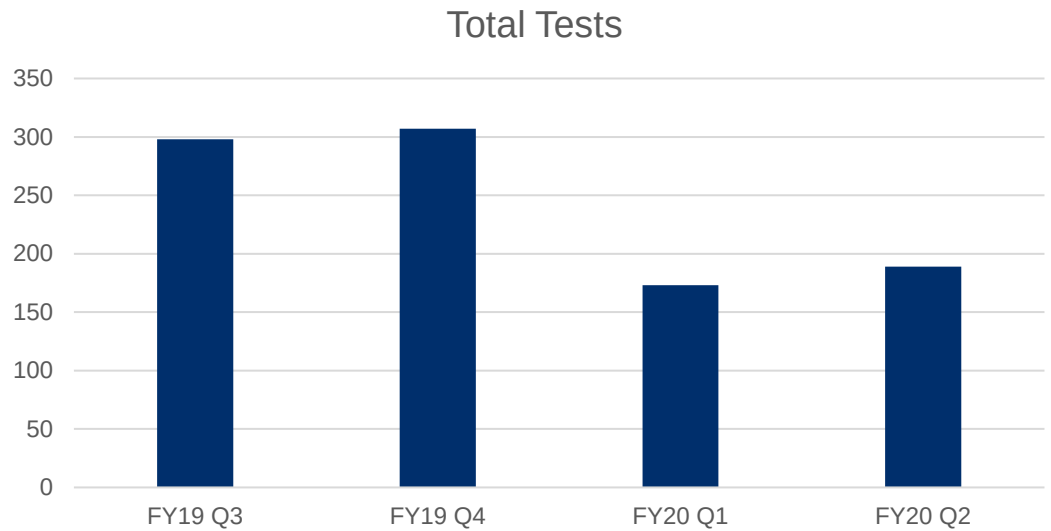
Poll 2



- Which property is being demonstrated in this data visualization?

a. Composition
b. Comparison
c. Relation
d. Distribution

Comparison among few items: Column Chart



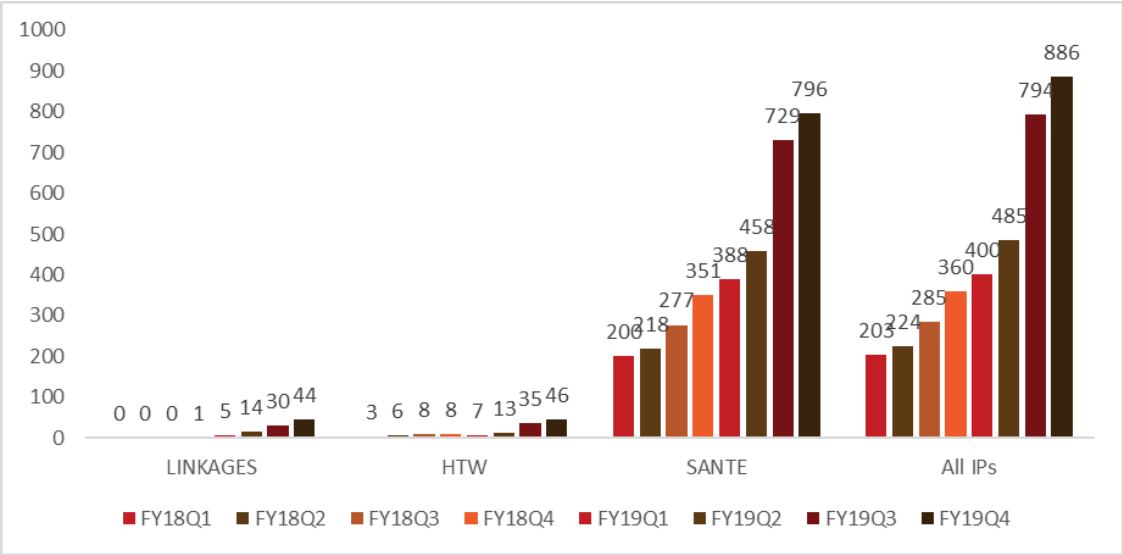
Column charts use vertical bars to show comparisons between categories. They present categorical data with rectangular bars, with heights or lengths proportional to the values that they represent and are effective for showing the value at a point in time.

The bars can be plotted vertically (column chart) or horizontally (bar chart, especially useful with long/many descriptions). 3QY745FQ9HY

Source: RTC/EQUIP, Zambia, SAPR FY'21

Comparison among multiple items: Grouped Column/Bar Chart

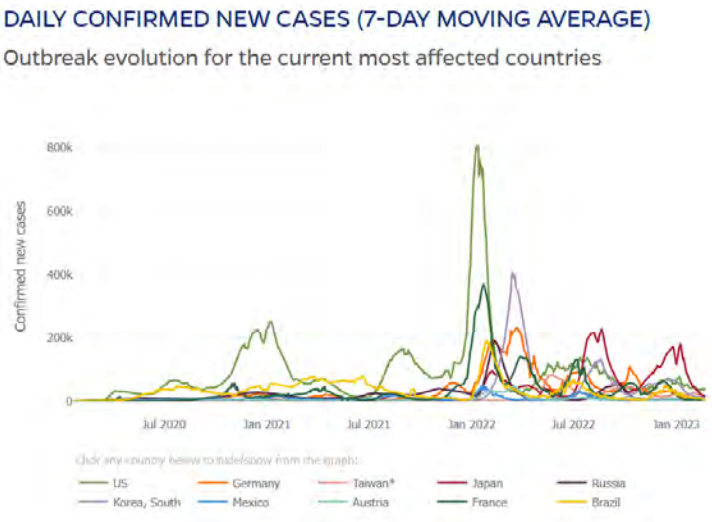
The grouped bar chart (also called: multi-set bar chart; clustered bar chart) is used when two or more data sets are displayed side-by-side and grouped together under specific categories on the same axis. Basically, it's the most simple bar chart with two or more graphs.



Graph: Number of patients on second line ARV regimen per IP (Haiti)
Source: EQUIP/Right to Care, Haiti, APR FY'19

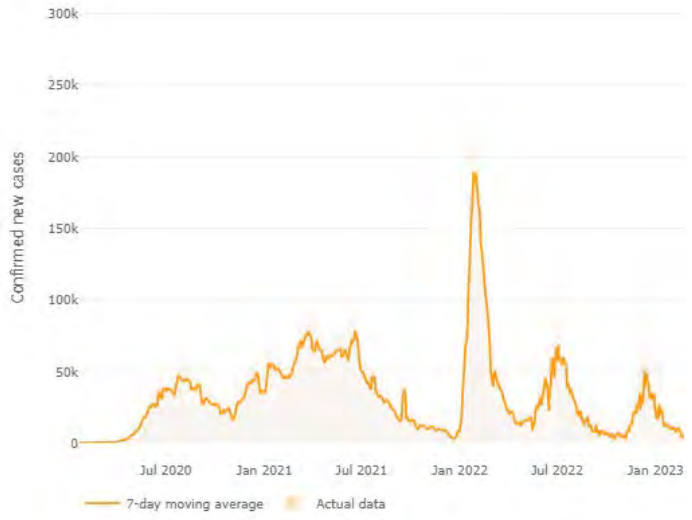
COMPARISON: Line Chart Over time

Daily confirmed new COVID-19 cases in 10 countries. Note the congestion, with all trend lines overlapping.



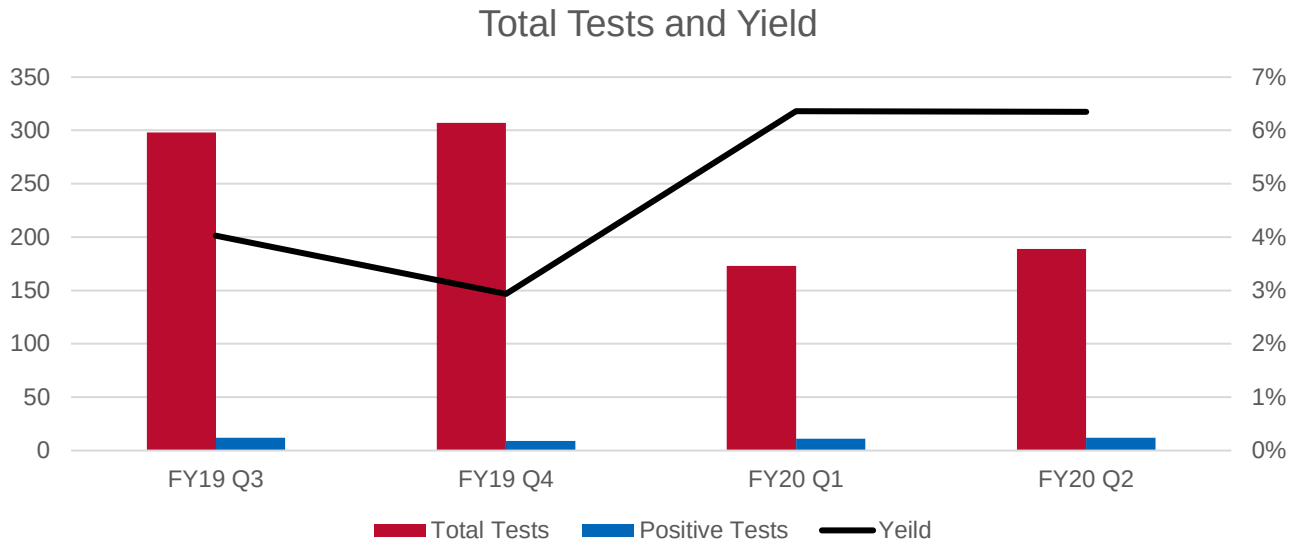
When you have a continuous data set, line charts are recommended. They are best suited to trend-based visualizations of only a few categories over a period of time.

It can be beneficial to filter out for just 1 or 2 trendlines for easier interpretations and comparisons. See below when filtering for Brazil only.



Source John Hopkins Corona Virus Resource Center (https://coronavirus.jhu.edu/data/new-cases)

COMPARISON: Column and Line



Columns allow for data to be compared easily between categories. Adding a line to the columns allows for another related category (potentially on a different scale) to be included in the same visual.

Be careful not to overfill a visual.

COMPARISON: Tornado chart

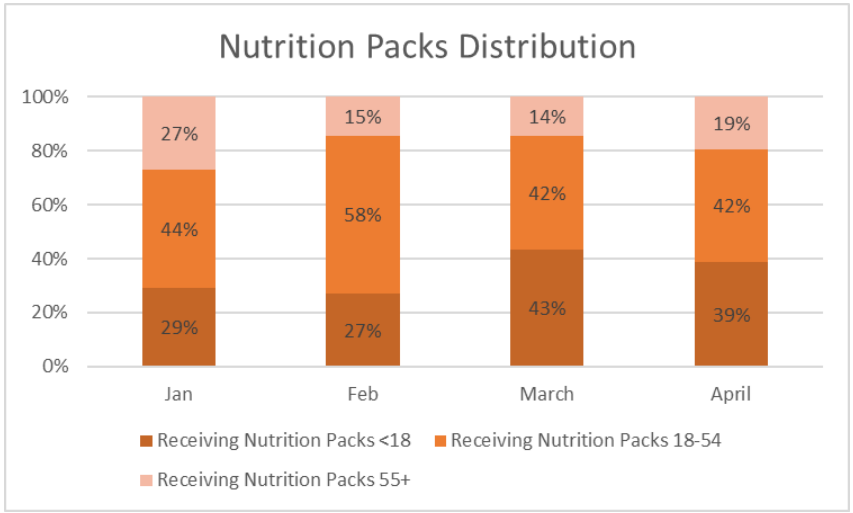
Tornado (or butterfly) charts are essentially bar charts comparing two differing metrics. Data categories are listed vertically, with the bars of differing metrics extending horizontally, on both ends of the listed categories.

These charts come in handy for comparing two data sets or metrics that are contrasting in nature, such as male-female, positive-negative, and the like.

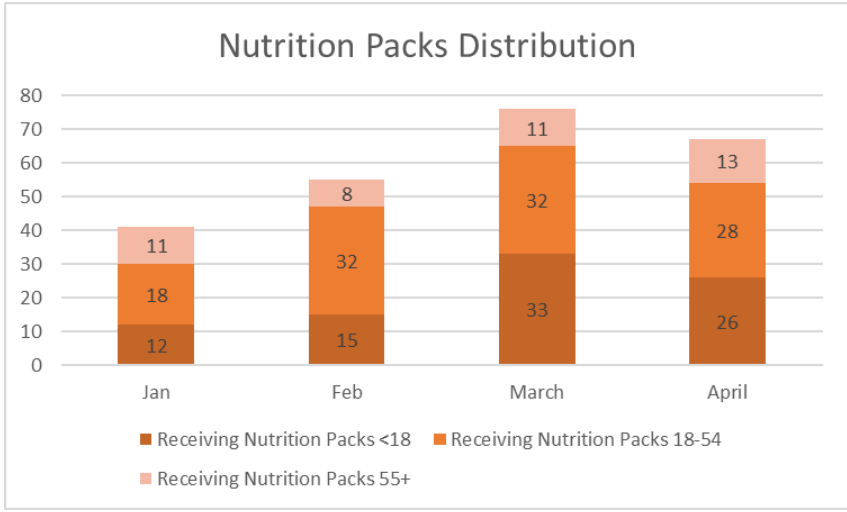
Source: Right to Care/QodeInside, 2020

Composition: Stacked Column Charts

Percentage column charts are similar to stacked charts but show values as a percentage—meaning that all the bars are the same length. You can use them the same way as stacked charts, and they are particularly useful when comparing relative differences.



Stacked column charts use vertical bars, divided into sub-parts, that show the cumulative values of a data item and compare the parts to the whole. Items stacked on top of one another are differentiated by color.

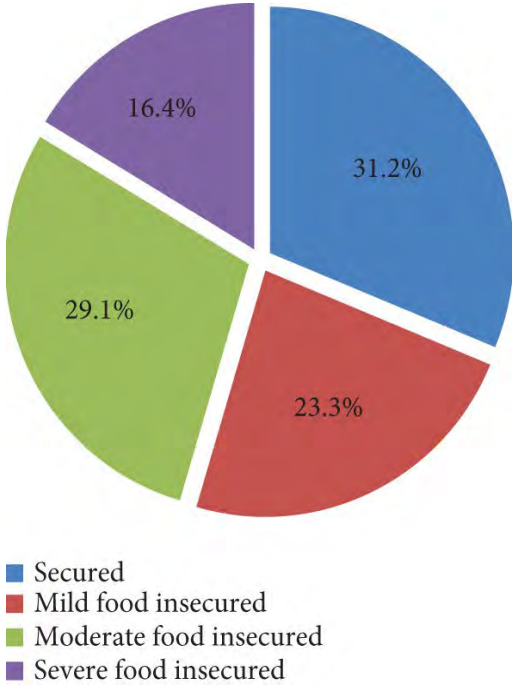


Note the difference in the examples, though they consist of the same numbers.

COMPOSITION: Pie Chart

A pie chart is used to visualize the relationship of a part to the whole, and typically represents numbers in percentages. Example:

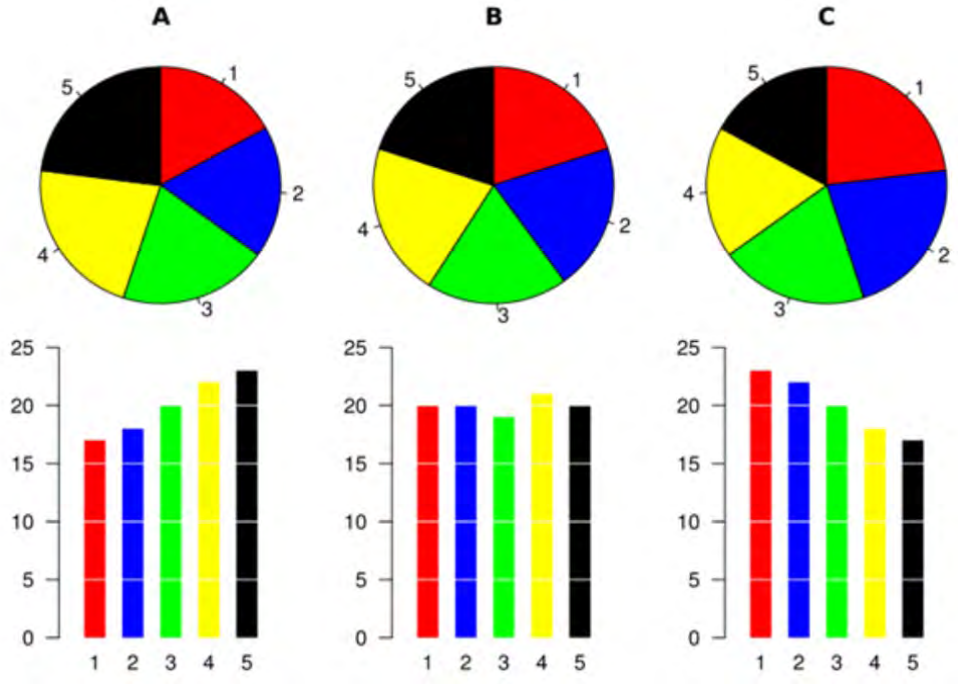
Level of food insecurity of respondents among people living with HIV/AIDS during follow-up at public hospitals of western Ethiopia



Poll 3

Which Pie Chart has the Smallest section of Green?

Poll 3



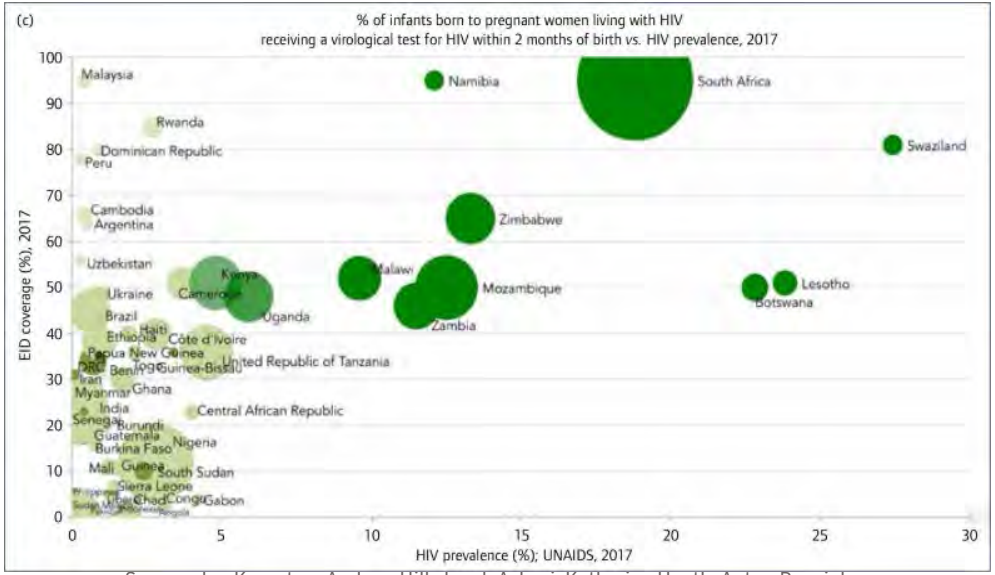
*Be cautious with use of pie charts when bar charts will suffice.

RELATIONSHIP: Scatter chart and Bubble graph

Scatter plot charts are primarily used to analyze correlations and distribution, and facilitate showing the correlation (or not) between two different variables. Correlation of Infant Mortality Rate and Total Fertility Rate.

Source: CDC Displaying Public Health Data - Correlation of Infant Mortality Rate and Total Fertility Rate Among 194 Nations, 1997 (https://www.cdc.gov/csels/dsepd/ss1978/lesson4/section4.html)

A bubble chart allows one to add at least another dimension to a scatter chart (e.g., you can add bubble size as the third variable and thus enable comparison).

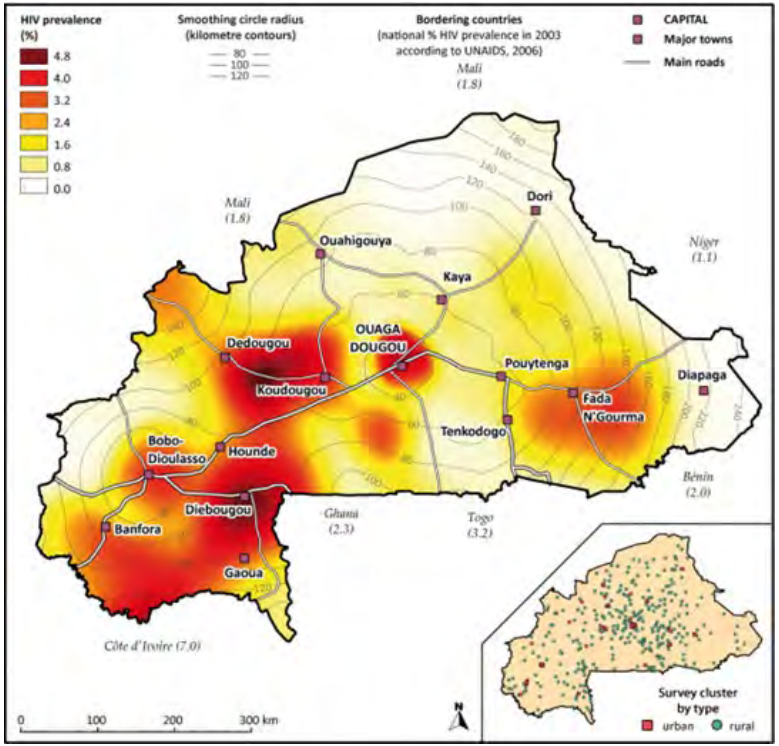


Source: Joe Kempton, Andrew Hill, Jacob A. Levi, Katherine Heath, Anton Pozniak, Most new HIV infections, vertical transmissions and AIDS-related deaths occur in lower-prevalence countries, Journal of Virus Eradication, Volume 5, Issue 2, 2019, (https://www.sciencedirect.com/science/article/pii/S2055664020300583)

CHART TYPOLOGIES CONTEXTUALISED: Map Charts

Map charts are great for giving numbers a geographical context to quickly spot trends, best and worst performing areas, and outliers.

Location data such as coordinates, names of provinces, districts, or community spots allow plotting related data on a map.



Source: J. Larmarange, R. Vallo, S. Yaro, P. Msellati, N. Méda, B. Ferry, Mapping HIV prevalence in Africa for a better understanding of epidemics : example from Burkina Faso using 2003 demographic and health survey data, XVIII International AIDS Conference, 2010

Data Visualizations: Some Style Do's and Don'ts

Sorting: For column and bar charts, to enable easier comparison, sort your data in ascending or descending order by the value, not alphabetically.

Data-Ink Ratio: Remove any information, lines, colors, and text from a chart that do not add value.

Labels: To avoid misinterpretation, use labels directly on the line, column, bar, pie, etc., whenever possible.

Colors: (a) Do not use more than six colors in any one chart.

(b) To compare the same value at different time periods, use the same color in a different intensity (from light to dark).

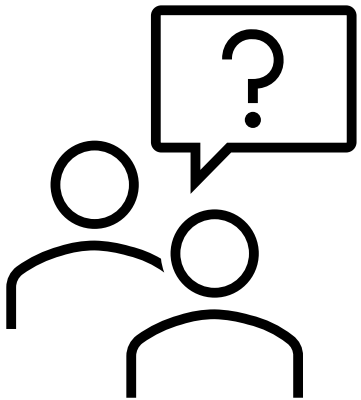
(c) For different categories, use different colors. The most widely used colors are black, white, red, green, blue, and yellow.

(d) Keep the same color palette or style for all charts in the series, and the same axes and labels for similar charts, to make your charts consistent and easy to compare.

LAST BUT NOT LEAST:

Data visualization is not a goal in its own right.
It is meant to facilitate data use to cultivate a results-focused decision-making environment.

Questions?



ASAP II

ACCELERATING SUPPORT TO ADVANCED LOCAL PARTNERS II

Thank you for your time.

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